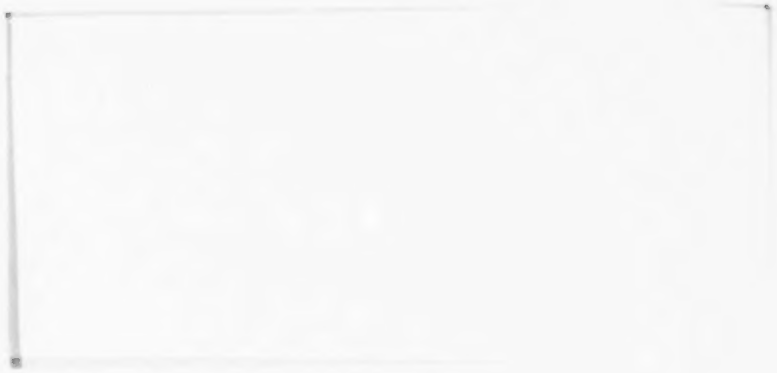
POLAR BEAR TAGGING IN EASTERN LANCASTER SOUND AND BAFFIN BAY, 1980

Wildlife Service
Northwest Territories Renewable Resources



POLAR BEAR TAGGING IN EASTERN LANCASTER SOUND AND BAFFIN BAY, 1980

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N.W.T. WILDLIFE SERVICE

1983

Manuscript Report

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ABSTRACT

We were successful in capturing 81 polar bears (41 females and 40 males) in Lancaster Sound and Baffin Bay. The population, based on the data from 1980 and that of the two preceding years, was estimated to be between 700 and 1000 animals. We were unable to recover any of the satellite transmitters that had been placed on bears during the spring of 1979 although two bears which had shed their collars were captured and examined. The drugs ketamine and xylazine were tested and found effective for immobilizing polar bears. Carfentanil was also used and proved effective but requires further testing. Blood and hair samples were collected for serological and mercury analysis, respectively.

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INTRODUCTION

In April and May of 1978 and 1979, the N.W.T. Wildlife Service conducted polar bear mark-recapture studies in eastern Lancaster Sound and Baffin Bay (Fig. 1) as part of the Eastern Arctic Marine Environmental Studies (EAMES). In the spring of 1980 we undertook the present study to supplement the previously gathered information (Schweinsburg et al. 1977 and Schweinsburg et al. 1980) regarding: 1) movements and distributions of bears, 2) population size, and 3) age structure, mortality and natality.

To augment data gathered from mark-recapture, 4 satellite radio transmitters were placed on polar bears during the spring of 1979. Movements of these polar bears were monitored via satellite for over a year. Because the battery life of these transmitters was only about 18 months, we attempted to locate the bears during this study to remove the harness and radios. As well as removing the transmitters we hoped to be able to observe the effects of the harness on the bears.

Previous polar bear mark-recapture projects undertaken by the N.W.T. Wildlife Service used phencyclidine HCl[1] to immobilize bears. This drug has become difficult to obtain as federal authorities have restricted its production because of increasing street abuse. In addition, with bears, phencyclidine HCl frequently causes undesirable side effects such as convulsions and respiratory arrest. In an effort to find a suitable alternative to phencyclidine HCl, we explored the

[1]Sernylan (phencyclidine HCl) Parke, Davis and Co., Brockville, Ontario.

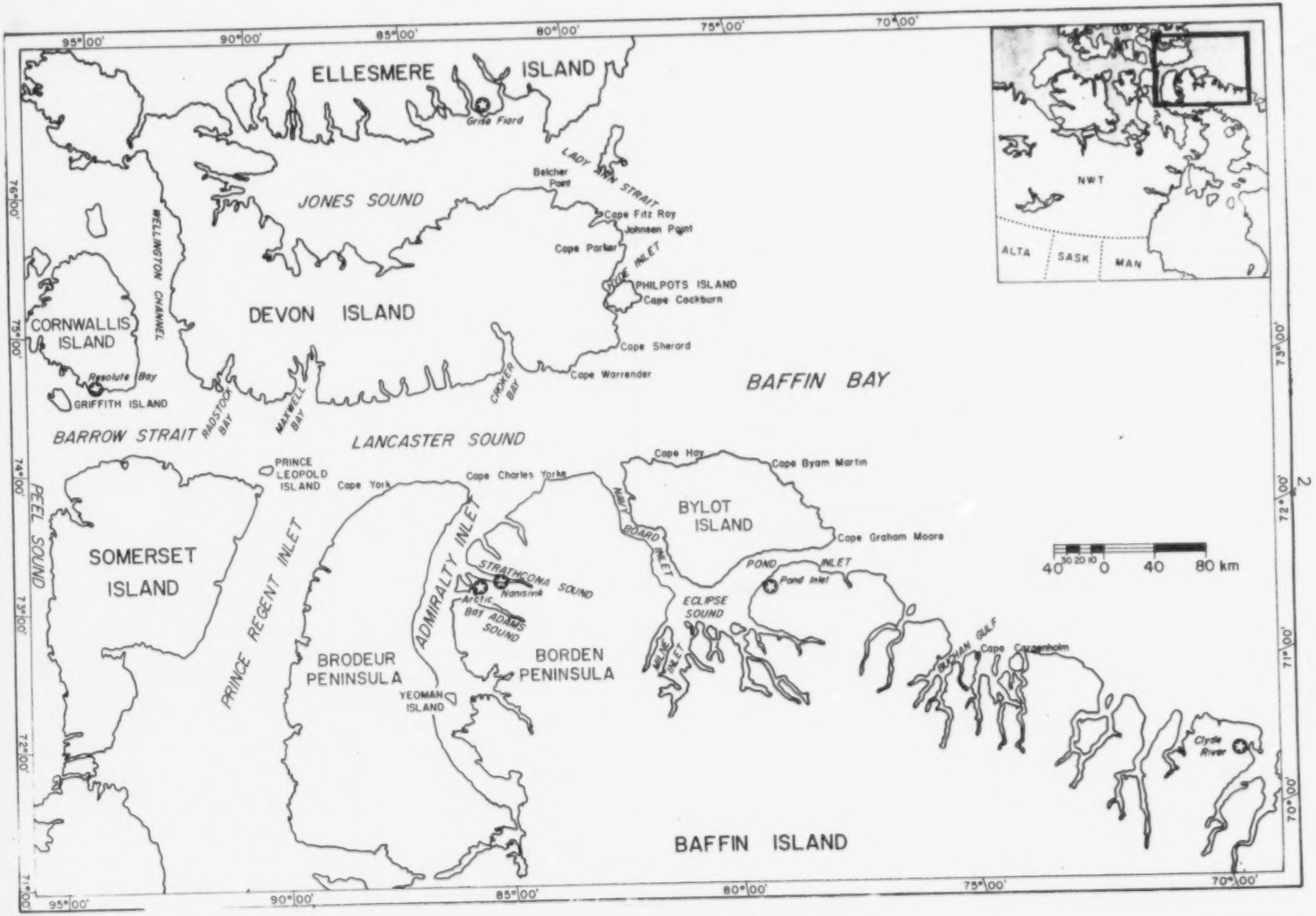

Figure 1. Polar bear study area in eastern Lancaster Sound and adjacent areas

use of three new drugs: ketamine HCl[2], xylazine HCl[3] and carfentanil[4]. Ketamine in combination with xylazine has proved effective for immobilizing black and grizzly bears (Addison and Kolenosky 1979, Haigh 1978) but has not previously been used to any extent on polar bears. Carfentanil is a relatively new and very potent narcotic which remains untried in large North American carnivores.

[2]Ketamine HCl Parke, Davis and Co., Brockville, Ontario.

[3]Rompun, Bayvet, Mississauga, Ontario.

[4]Carfentanil, Janssen Pharmaceutica, Beerse, Belgium.

STUDY AREA

The study area (Fig. 1) is described extensively in Schweinsburg et al. (1980). During the spring of 1980, break up in eastern Lancaster Sound was considerably earlier than the two previous years and ice conditions (Fig. 2) were comparable to normal years as described by Latour (1978). Temperatures from 28 April to 7 June were generally mild, ranging between -20°C and 0°C. CAVU conditions were experienced on Devon Island, in early May, while ocean fog and heavy overcast prevailed on the north coast of Baffin Island during most of May.

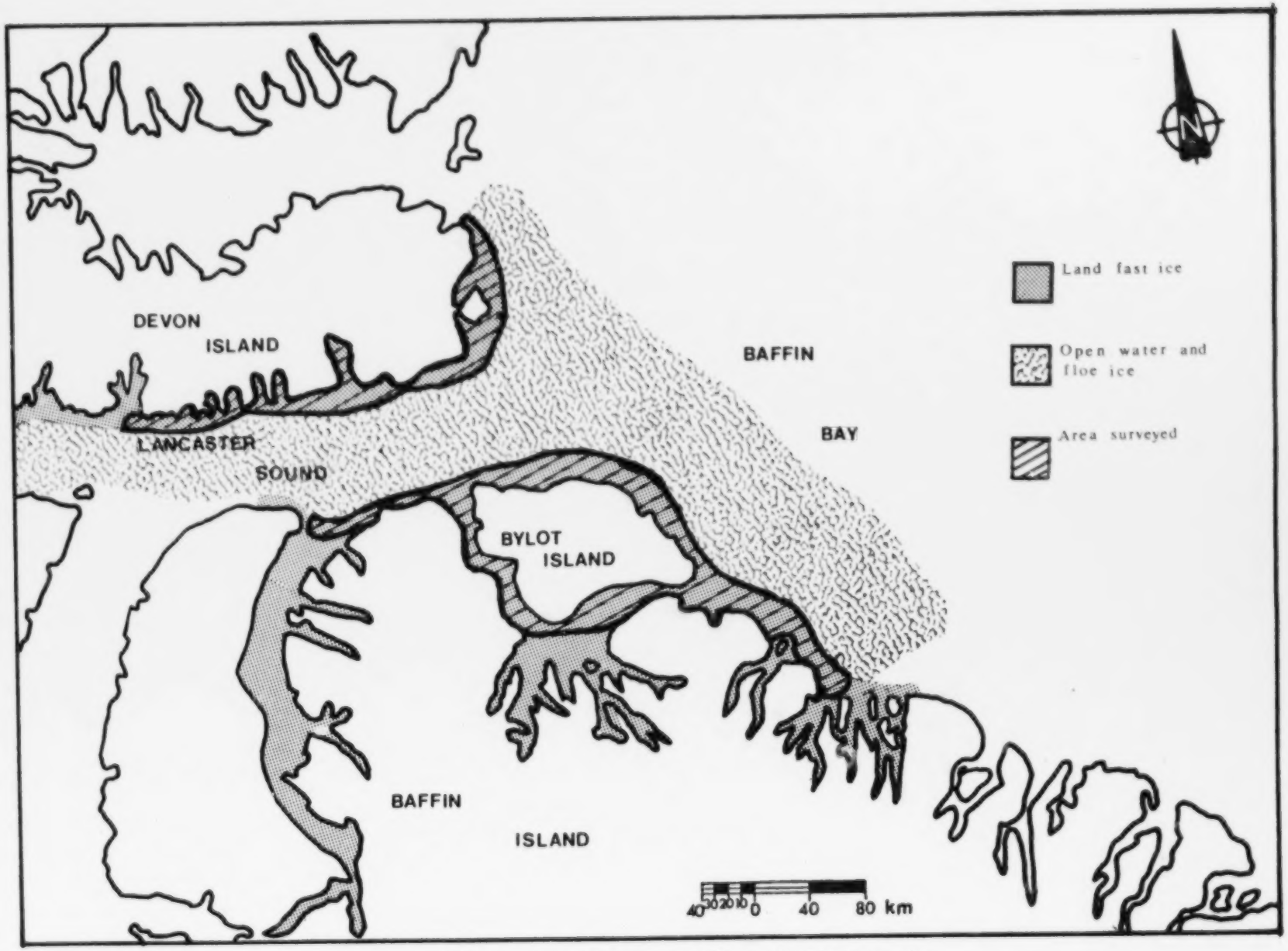

Figure 2. Area surveyed for polar bears and ice conditions in Lancaster Sound during April, May and June, 1980

METHODS

A Kenting helicopter (KBL) 206B, was used to search for polar bears. Figure 2 outlines the areas searched and Table 1 summarizes the search effort. From 28 April to 8 May we worked along the south and east coasts of Devon Island, and from 9 May to 7 June we were based out of Pond Inlet. The majority of polar bears were located by direct observation although when snow conditions were favourable we were able to track bears. Search effort was concentrated over ice habitats such as floe edges and areas of drifted pressure ridges which have proven productive in past studies. Areas of high track density were given particular attention during search time, but we did not search past the floe edge for safety reasons.

Standard techniques of polar bear capture by helicopter were used (Lentfer 1968, Larsen 1971). Once polar bears were immobilized, they were marked with individually numbered polyurethane ear tags and were tattooed on the upper lips with a number corresponding to the ear tag. Data recorded for each bear included weight, sex, total length, chest girth and physical condition. The first premolar was pulled for age determination. Each bear was painted with a number for subsequent identification from the air. Respiratory rates, heart rates and rectal temperatures were recorded for bears that were immobilized with a single injection. Blood samples (approximately 100 ml) for blood chemistry were taken from the last 33 bears captured (Appendix A) and hair samples from the front shoulders were taken for mercury analysis.

Searches were made for satellite transmitters at altitudes ranging from 600 to 1600 meters. A portable receiver tuned to 164.5125 MHz was used in conjunction with a four element yagi antenna.

Table 1. Summary of search effort for polar bears in Lancaster Sound area during May and June, 1980.

Area	Number of hours flown	Bears per hour flown
South Devon Island	28.4	1.2
East Devon Island	16.0	0.4
Northeast Bylot and Baffin Island	38.8	0.6
Northwest Bylot and Baffin Island	23.8	0.4
Overall	107.0	0.8

Searches were concentrated in areas where the latest satellite fix was recorded.

Powdered forms of the drugs ketamine and xylazine were combined and dissolved in sterile distilled water to a concentration of 200 mg of ketamine and 200 mg of xylazine per ml of solution. This combination was administered to bears at dosages of approximately 5.5 mg of ketamine and 5.5 mg of xylazine per kg of body weight. Dr. J. Haigh, from the University of Saskatchewan, accompanied us during part of the field work and tested carfentanil. We used carfentanil in two standard doses, 2.5 mg and 5.0 mg. Preloaded darts containing 2.5 mg carfentanil were administered to yearlings, 2 year olds and small subadults while darts containing 5 mg were used to immobilize larger bears. After tagging was complete, bears were injected with naloxone[5] HCl, a narcotic antagonist. Doses of naloxone were relatively standard: 20 mg subcutaneous, 40 mg intramuscular and 60 mg intravenous.

Population estimates, based on mark-recapture data, were calculated using a modified Peterson method (DeMaster et al. 1980). The survival rate (Ø) of 0.871 used in the population estimate calculations was taken from Schweinsburg et al. (1980) and was derived from the age distribution using an exponential curve fitted by a log-linear regression. An error variance of 0.0037 was used as calculated by DeMaster et al. (1980) when considering a range of survival rates from 0.76 to 1.0.

5 Naloxone, Cynamid at Canada Ltd., Montreal, P.Q.

RESULTS AND DISCUSSION

Distribution and Population

Eighty-one polar bears (41 females and 40 males) were captured, (Fig. 3 and 4) marked and released (Appendix B and C). Twelve family groups were captured: 7 cubs-of-year (COY) in 6 groups, 2 yearlings in 2 groups and 6 2-year olds in 4 groups . Twenty-nine of the 81 bears we captured in 1980 had been originally tagged in the study area and five during previous studies in other areas. This overall recapture rate of 43% is high in relation to recapture success in 1978 (7%) and 1979 (20%). Large numbers of tagged bears were captured along the south and east shores of Devon Island. Sixty percent of the 42 bears captured in these areas were recaptures, as compared to only 18% recapture from North Baffin Island. This difference is to be expected as over 75% of the bears tagged during the 1979 study were captured along the coast of Devon Island. Although some tags had been damaged or lost, all bears were identifiable. No handling or drug related deaths occurred.

Twenty-five resightings (Fig. 5 and 6) of marked bears occurred (Appendix D) during the study but one bear could not be identified because the painted number had faded. Seventeen bears were resighted once and four bears were resighted twice. Ten bears were sighted but capture was not possible due to adverse weather or ice conditions (Appendix E).

Distribution of bears was similar to that reported by Latour (1979), with mouths of major inlets and bays being the most productive. Forty percent of the bears were sighted on flat land-fast ice, 46% on rough land-fast ice and 14% on the floe-edge or floe ice.

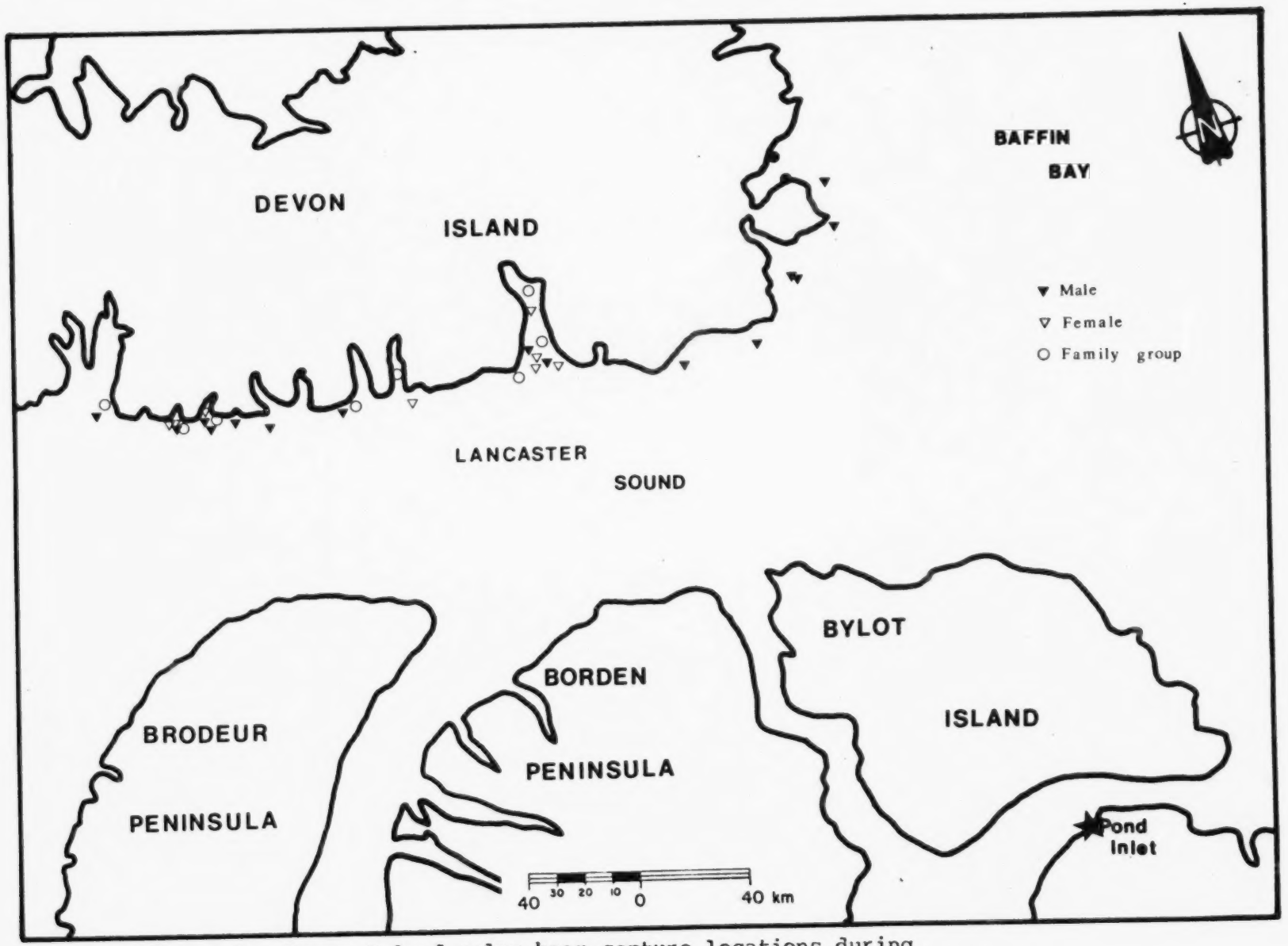

Figure 3. Devon Island polar bear capture locations during April and May, 1980

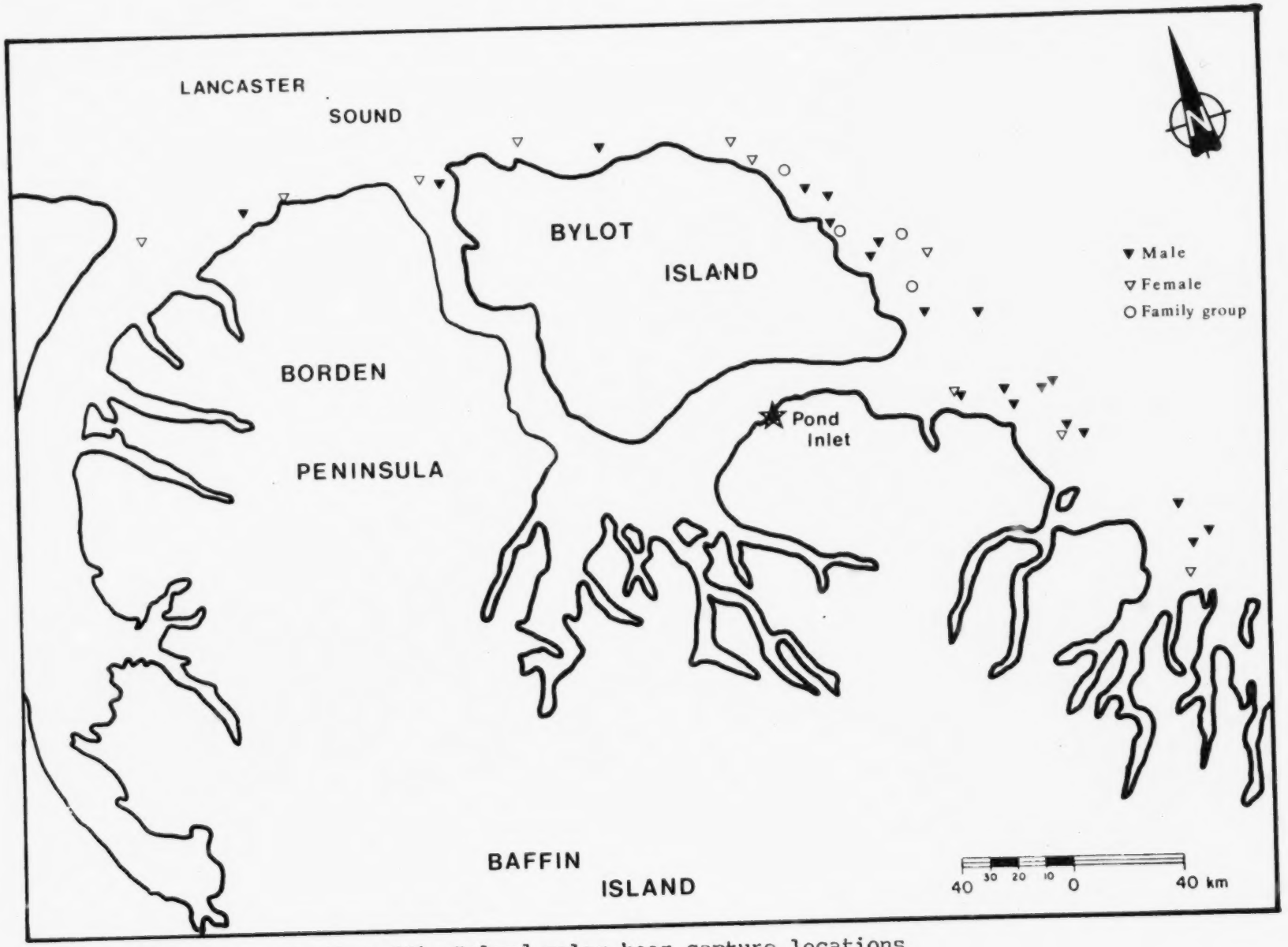

Figure 4. North Baffin Island polar bear capture locations during May and June, 1980

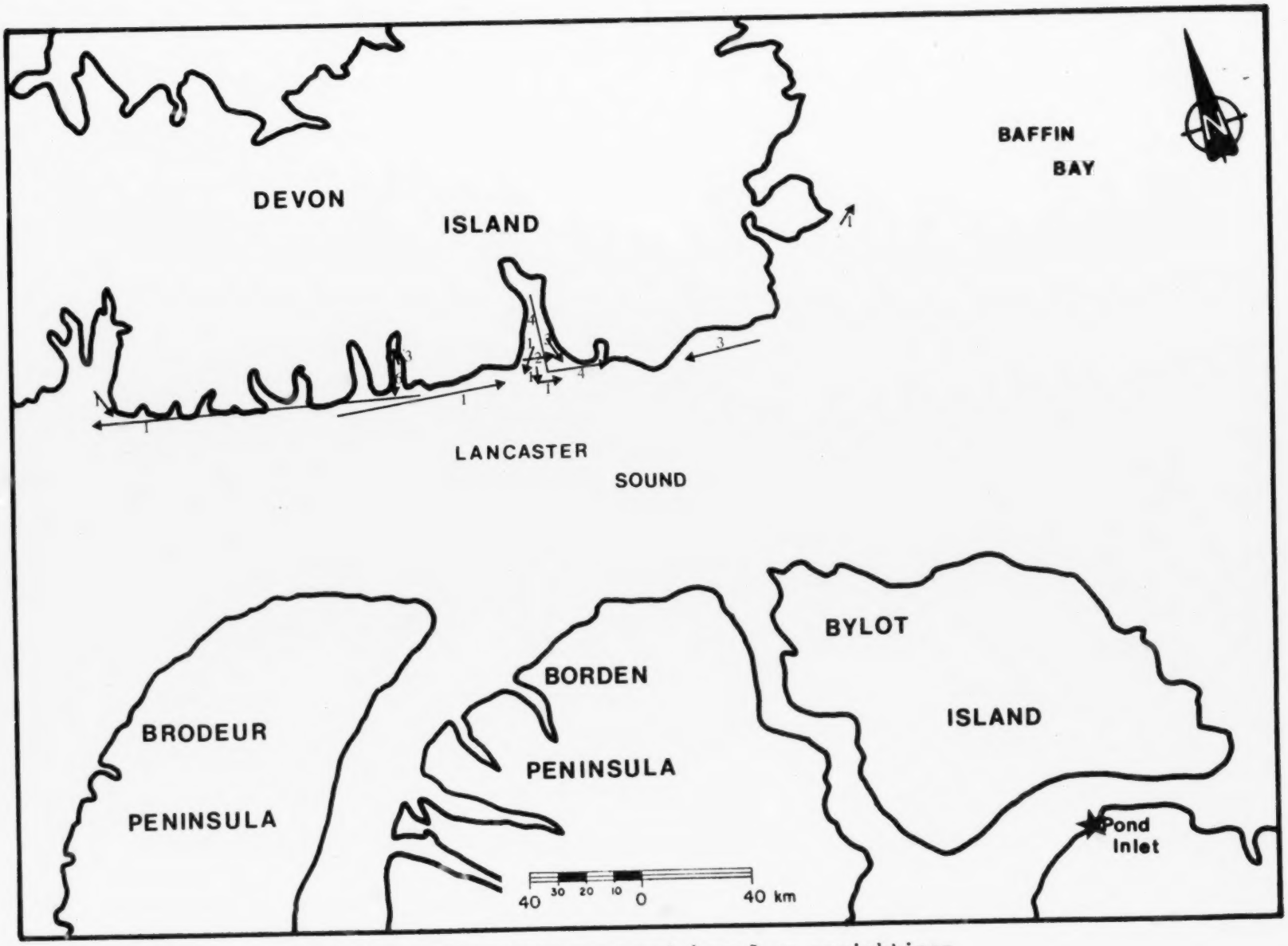

Figure 5. Short-term polar bear movement based on resightings along the coast of Devon Island during May and June of 1980. Number on arrows indicate number of days between occurrences

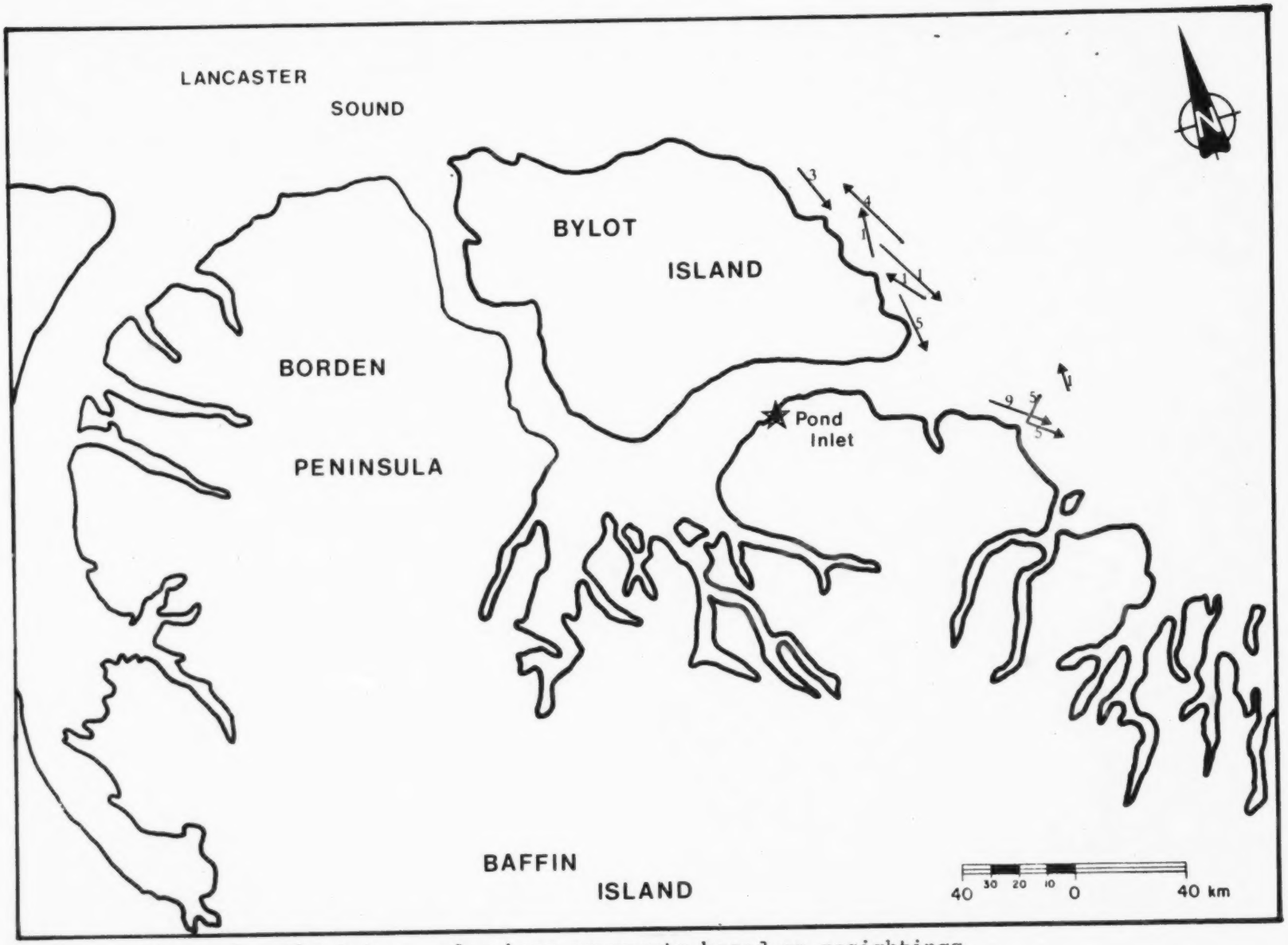

Figure 6. Short-term polar bear movements based on resightings along the north Baffin Island coast during April and May, 1980. Number on arrows indicate number of days between occurrences

There appeared to be little pattern to short term movements based on resightings, with bears tending to remain in the same vicinity they were captured.

Table 2 shows the population estimates N_i for eastern Lancaster Sound based on this and all previous studies. We calculated that there are approximately 670 polar bears in this area and the standard error of this estimate is relatively low, ±115 bears. This estimate is approximately 300 bears lower than that calculated by Schweinsburg et al. (1980). Because of the large number of bears now marked in Lancaster Sound and the relatively small standard error associated with our 1979 and 1980 estimates, the most reliable population number probably lies between 700 and 1000 animals.

Age structure of captive bears is summarized in Table 3. Mortality and natality rates were not determined. A future report summarizing all studies in F Zone will deal in depth with the population dynamics of this group.

Physical Condition of Polar Bears

General physical conditions of captured polar bears ranged from obese to emaciated. Two bears, a COY and a subadult were found in the final stages of starvation while several other bears were severely emaciated. The COY had recently been abandoned by its mother and sibling near Croker Bay, while near Radstock Bay the subadult was found unable to rise from a recumbent position and eventually died. The COY was euthanized and sent to University of Saskatchewan Veterinary School for necropsy results of which indicated starvation as the cause of death (Appendix F). Using a subjective fat index of 1 to 5 (1 being thin) as a criterion, Devon Island seemed to

Table 2. Summary of mark-recapture data from eastern Lancaster Sound and estimates of population size (N_i).

Year	1970/72	1973	1974	1975	1976	1977	1978	1979	1980
i	1	2	3	4	5	6	7	8	9
n_i	4	9	11	33	64	5	56	176	81
m_i	0	1	1	0	0	1	2	21	29
R_i	3	9	11	29	64	5	55	175	81
P_i	-	0.11	0.09	0	0	0.2	0.036	0.119	0.358
M_i	-	2.66	9.43	17.2	40.89	92.83	85.69	122.74	241.04
S_eM_i	-	.54	1.29	2.11	4.03	8.03	9.27	12.38	20.78
N_i	-	-	-	-	-	464	2380	1031	673
S_eN_i	-	-	-	-	-	416.7	1695.8	236.3	115.8

n_i The total number of bears captured on the ith sample.

m_i The total number of previously marked bears captured in the ith sample.

R_i The total number of marked animals (including recaptures released in th ith sample.

P_i The proportion of animals marked in the population.

M_i The number of tagged animals available for sampling just prior to the i sample.

S_eM_i The standard error of M_i.

N_i The number of animals present in the population at time i.

S_eN_i The standard error of N_i.

Table 3. Age structure of polar bears captured in Lancaster Sound area during April, May and June, 1980.

Age	Number of Bears		
	Male	Female	Male and female
Unknown	0	1	1
0	2	5	7
1	1	1	2
2	4	5	9
3	0	2	2
4	4	3	7
5	5	5	10
6	0	2	2
7	3	3	6
8	3	5	8
9	3	0	3
10	3	1	4
11	2	1	3
12	3	0	3
13	0	0	0
14	0	0	0
15	0	0	0
16	0	1	1
17	1	1	2
18	1	1	2
19	0	1	1
20	0	0	0
21	0	0	0
22	3	2	5
23	1	0	1
24	0	0	0
25	1	0	1
26	0	0	0
27	0	0	0
28	0	1	1
Total	40	41	81

have a greater number of thin bears. Sixty-four percent of the bears captured along the south and east coasts of Devon Island had a fat index of 2 or less as compared to only 5% from the north Baffin region. The reason for this is not clear but there did appear to be larger numbers of ringed seals on the ice in the north Baffin region.

Analysis of blood samples for the presence of antibodies to Leptospirosis sp. and Trichinella spiralis proved negative. Results of the biochemical blood analysis are listed in Appendix A and will be considered in a future report. Results of mercury analysis of polar bear hairs are summarized by Eaton and Ferant (1982).

Status of Satellite Collared Bears

Bear X5105, which had been captured near Cape Warrender in 1979 and fitted with a satellite transmitter, was recaptured in 1980 near the north end of Croker Bay. When captured, the bear was wearing neither the radio transmitter nor the harness. We found a slight rub mark on the fur of the upper neck and there was a relatively fresh wound on the bear's right flank. The cut was approximately 16 cm long and about 2 cm wide running dorsoventrally. The wound was probably caused by the broken harness slipping back and rubbing. Similar rub marks and wounds were found on the other bears affixed with the harness (Lee 1981). A brief search with antenna and receiver failed to locate the transmitter of this bear or the other transmitter placed on bear X5037 in the same vicinity during May 1979. The final satellite fixes from these two transmitters placed X5105 near the mouth of Croker Bay on June 15, 1979 and X5037 on the north coast of

Devon Island on September 13, 1979. A search was also made in the Buchan Gulf area of north Baffin Island for a third satellite transmitter on bear X5032, but although contact was made, we were unable to locate the transmitter accurately enough to recover it. Because of time constraints and weather conditions, we were unable to look for the fourth satellite transmitter which was last located on the ice at the mouth of Admiralty Inlet. Supplementary to this study, extensive high altitude searches by fixed wing aircraft during August 1980, failed to detect signals from any of the transmitters. As satellite fixes are no longer being obtained we assume that the transmitter will not be recovered.

Immobilizing Drugs

We successfully immobilized 45 polar bears using ketamine in combination with xylazine. Induction times (Table 4) were comparable to those experienced with Phencyclidine HCl, but induction was smoother. None of the bears convulsed and respiration, although slightly depressed, was quite regular. We found a significant difference in both effective dosage and induction time between COY and older bears. Results are discussed in detail in Lee et al. (1981) but generally we found ketamine and xylazine to be a good alternative to phencyclidine.

Carfentanil also proved effective in immobilizing polar bears and 32 bears were processed using this drug (Table 5). Induction times averaged 5.1 minutes (S.D.=2.6, n=24). Bears were administered naloxone as an antagonist and it took an average of 8.76 minutes (S.D.=6.53, n=19) for the bears to become active after injection.

Like ketamine and xylazine, the carfentanil and naloxone combination appear to be an excellent alternative to phencyclidine but at present its distribution is restricted due to its narcotic nature. The results of the carfentanil immobilization are discussed in depth by Haigh et al. (1983).

Table 4. Observations on single intramuscular administrations of ketamine HCl and xylazine HCl to polar bears during April, May and June, 1980

	Bears > 1 year				Cubs of the year			
	Mean	Sd	Range	Sample	Mean	Sd	Range	Sample
Induction dosage (*mg/kg)	6.8	1.5	5.0 - 10.6	21	2.8	1.3	1.6 - 5.0	6
Time to first effect (min)	4.6	2.6	1.0 - 10.0	17	1.6	0.9	1.0 - 3.0	5
Induction time (min)	13.2	7.2	4.0 - 30.0	21	2.0	1.3	1.0 - 4.0	6
Respiration rate (bpm)	10.1	3.2	5.0 - 17.0	17	11.3	2.1	9.0 - 13.0	3
Heart rate (bpm)	62.3	14.3	36.0 - 90.0	17	78.7	20.6	63.0 - 102.0	3
Rectal temperature (^{o}C)	38.7	1.1	36.4 - 40.2	17	38.1	1.5	36.4 - 39.0	3

* Dosage refers to both ketamine HCl and xylazine HCl in a 1:1 solution; i.e., 6.8 mg/kg indicates 6.8 mg/kg ketamine HCl and 6.8 mg/kg xylazine HCl.

Table 5. Observations on single intramuscular administrations of carfentanil to adult polar bears.

	Mean	Sd.	Range	Sample Size
Induction dosage (mg/kg)	0.023	0.007	0.021 - 0.036	24
Time to first effect (min)	4.3	2.1	1.75 - 10.0	24
Induction time (min)	5.1	2.6	2.2 - 12.0	24
Up time after antagonist (min)	8.8	6.5	0.7 - 25.0	19
Heart rate (bpm)	60.0	21.2	27.0 - 123.0	24
Rectal temperature ($0^{o}C$)	39.5	1.02	38.2 - 41.9	24
Respiration rate (bpm)	3.6	1.1	1.0 - 5.1	24

ACKNOWLEDGEMENTS

We gratefully acknowledge the logistic support of Polar Continental Shelf Project, Petro-Canada Explorations Ltd. and the Northwest Territories Wildlife Service. C. Armstrong, G. Smith and G. Webb of Kenting Helicopters provided efficient and professional helicopter service. A. Sutherland, (NWT-WS) and W. Calvert (CWS) aged all the bears. Special thanks to J. Haigh of the University of Saskatchewan Veterinary School for his expertise and cooperation, and to B. Bergman, NWT-WS for his assistance during our stay in Pond Inlet. Mercury analysis was done by Dr. R.D.P. Eaton of Charles Camsell Hospital, Edmonton, Alberta. The Animal Pathology Division of Agriculture Canada, Lethbridge, Alberta, examined blood samples for Leptospirosis sp. and C.E. Tanner of McGill University, Montreal, analysed blood for the presence of Trichinella spiralis antibodies. E. Irvine, NWT-WS, typed and assisted in editing this report.

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APPENDIX A. Results of analysis of blood from polar bears captured in Lancaster Sound during May and June, 1980.

University of Minnesota Polar Bear Blood Analysis, Spring 1980

Analysis	Bear number 5040	5250	5258	5260	5261	5263	5265	5266	5268	5270	5272	5277	5276	5278	Mean SD
Glucose	132	130	94	127	112	98	104	144	122	66	125	133	127	125	117.1±20.4
BUN	32	27	29	19	62	70	43	27	16	15	32	39	45	23	34.2±16.3
Creatinine	1.5	1.1	1.3	1.2	1.1	2.5	1.0	1.4	1.1	1.2	1.2	1.2	1.2	1.8	1.3±0.39
T. Protein	7.4	6.4	5.6	6.0	6.6	6.6	6.3	6.6	6.6	6.4	7.2	6.6	7.3	6.3	6.6±0.5
Albumin	3.63	4.07	3.65	4.28	4.32	4.13	4.38	4.31	5.12	5.15	5.05	5.12	4.47	3.62	4.38±0.55
Globumin	3.77	2.33	1.95	1.72	2.28	2.47	1.92	2.29	1.48	1.25	2.15	1.48	2.83	2.68	2.19±0.65
A/G	1.0	1.7	1.9	2.5	1.9	1.7	2.3	1.9	3.5	4.1	2.3	3.5	1.6	1.4	2.2±0.9
% Alb	49.1	63.6	65.1	71.4	65.5	62.6	69.6	65.3	77.5	80.4	70.2	77.6	61.3	57.4	66.9±8.4
$\%\alpha_1$	4.1	3.5	5.8	2.3	5.9	7.8	7.3	5.9	3.4	1.0	2.5	3.3	7.8	8.5	4.9±2.4
$\%\alpha_2$	11.7	13.5	9.9	9.0	10.9	12.8	10.1	11.0	8.0	10.3	10.3	10.5	13.1	9.6	10.8±1.6
$\%\beta_1$	9.7	10.0	7.7	9.7	7.1	7.3	8.6	9.6	8.1	7.3	7.7	6.9	8.5	10.9	8.4±1.2
$\%\gamma$	25.4	9.4	11.5	8.6	10.6	9.5	4.4	8.2	3.0	1.0	9.3	1.7	9.3	13.6	8.9±6.0
Na	137	129	131	142	141	140	142	141	142	148	148	138	146	145	140±4.9
K	4.3	4.1	4.6	4.2	4.4	4.8	4.7	5.2	4.9	4.9	4.3	4.4	4.5	4.0	4.5±0.3
Ca	9.6	8.8	9.1	9.1	9.8	10.0	10.2	10.2	10.3	10.1	9.7	9.7	10.8	9.8	9.8±0.5
P	5.1	4.8	6.0	5.3	6.4	7.2	5.4	5.8	6.0	6.7	7.4	6.3	7.8	4.7	6.1±1.0
Ca/P	1.9	1.8	1.5	1.7	1.5	1.4	1.9	1.8	1.7	1.5	1.3	1.5	1.4	2.1	1.6±0.2
Mg	2.1	1.8	1.7	2.0	2.1	2.2	1.8	2.2	1.9	1.9	2.2	2.0	2.8	1.9	2.0±0.3
Cu	80	32	23	33	27	20	25	28	23	45	27	20	63	25	33.6±17.6
SGOT	42	32	47	63	31	29	36	50	43	25	35	38	32	22	37.5±10.8
SGPT	78	18	23	24	17	17	19	20	23	17	19	24	16	9	23.1±16.3
CPK	4	3	8	5	3	2	8	10	7	5	8	5	4	1	5.2±2.6
LDH	742	721	827	848	721	551	954	869	1166	1018	983	890	885	603	834.1±161.8
Alk. Phos.	0.8	6.0	10.0	13.8	3.3	1.9	4.8	5.4	2.1	1.7	1.9	4.9	10.8	0.7	4.9±4.1
Tot lipid	923	896	879	798	1103	1519	1209	1059	1226	1056	1395	1204	1206	1215	1120.2±203.7
Cholesterol	305	279	313	223	360	379	418	335	448	308	437	330	388	506	358.9±75.1
Gelman Electro HDL Chol	174	134	257	172	173	129	213	194	297	213	328	—	248	359	222.4±71.9
Sigma PPT HDL Chol	205	184	247	179	258	245	374*	235	326	201	302	218	288	394	261.1±67.6

*

N.B. All samples negative for presence of antibodies to Trichinalla spiralis, Leptospirosis ponona, L. hardjo, L. ballum.

APPENDIX B. Polar Bear Captures, Lancaster Sound, 1980.

Polar bear captures, Devon Island, 1980.

Bear Number	Reason	Sex	Age	Date	Location	Lat.	Long.
X5142	Recapture*	F	17	28 Apr. 80	3 km W. Powell Inlet	7429	08538
X5184	Recapture*	F	01	28 Apr. 80	3 km W. Powell Inlet	7429	08538
X3570	(X5211) Recapture	M	12	28 Apr. 80	2 km S.E. Blanley Bay	7427	08715
X5100	Recapture*	F	16	28 Apr. 80	Mouth of Maxwell Bay	7434	08845
X5102	Recapture*	F	02	28 Apr. 80	Mouth of Maxwell Bay	7434	08845
X3188	(X5212) Recapture	F	28	28 Apr. 80	One Bay West of Blanley	7430	08748
X2449	(X5150) Recapture	M	11	28 Apr. 80	One Bay West of Blanley	7429	08747
X5071	Recapture	F	22	28 Apr. 80	Blanley Bay	7428	08747
X4995	Recapture	M	10	29 Apr. 80	12 km W. Cape Sherrard	7432	08049
X5098	(X5213) Recapture	F	07	30 Apr. 80	East Mouth Croker Bay	7432	08251
X5097	Recapture*	F	10	30 Apr. 80	Mid Croker Bay	7439	08322
X5214	Capture*	M	COY[1]	30 Apr. 80	Mid Croker Bay	7439	08322
X5105	Recapture	F	06	30 Apr. 80	Croker Bay	7445	08321
X5108	Recapture	M	22	30 Apr. 80	Mouth Croker Bay	7434	08322
X5151	Recapture*	F	07	30 Apr. 80	Cuming Inlet	7433	08504
X5215	Capture*	F	COY	30 Apr. 80	Cuming Inlet	7433	08504
X5216	Capture*	F	COY	30 Apr. 80	Cuming Inlet	7433	08504
X5217	Capture	F	03	2 May 80	3 km S.E. Cape Bullen	7428	08448
X5050	Recapture	M	18	2 May 80	7 km S.W. Powell Inlet	7428	08549
X5140	Recapture*	F	22	2 May 80	Blanley Bay	7428	08722
X5218	Capture*	F	COY	2 May 80	Blanley Bay	7428	08722
X5219	Capture	M	01	2 May 80	E. Side Maxwell Bay	7430	08838
X5220	Capture	F	08	2 May 80	Mouth Powell Inlet	7430	08523
X4428	Recapture	F	11	2 May 80	Croker Bay	7432	08306
X5051	Recapture*	F	07	3 May 80	5 km W. Cape Home	7432	08347
X5231	Capture*	F	COY	3 May 80	5 km W. Cape Home	7432	08347
X5235	Capture	F	04	3 May 80	Blanley Bay	7428	08754
X5138	Recapture*	F	08	3 May 80	Croker Bay	7447	08316
X5047	Recapture*	M	01	3 May 80	Croker Bay	7447	08316
X3696	(X5232) Recapture*	F	19	3 May 80	7 km W. Blanley Bay	7427	08743
X5233	Capture*	M	02	3 May 80	7 km W. Blanley Bay	7427	08743
X5234	Capture*	F	02	3 May 80	7 km W. Blanley Bay	7427	08743
X3566	(X5236) Recapture	M	25	4 May 80	7 km S.E. Cape Cockburn	7451	07915

Polar bear captures, Devon Island, 1980. (continued)

Bear Number	Reason	Sex	Age	Date	Location	Lat.	Long.
X5237	Capture	M	05	4 May 80	14 km N.E. Cape Warrender	7432	08118
X5238	Capture	F	05	4 May 80	3 km E. Cape Rosamond	7435	08322
X3996	(X5239) Recapture	M	05	5 May 80	Bethune Inlet	7446	07954
X5240	Capture	M	05	5 May 80	Bethune Inlet	7446	07954
X5241	Capture	M	08	5 May 80	3 km E. Cape Horsburgh	7501	07926
X5242	Capture	M	02	6 May 80	3 km S.W. Stratton Inlet	7427	08641
X3116	(X5243) Recapture	M	09	6 May 80	3 km S.W. Hobhouse Inlet	7427	08711
X5244	Capture	M	23	6 May 80	Blanley Bay	7428	08722
X3883	(X5245) Recapture	M	10	6 May 80	Croker Bay	7437	08315

* Family Group

1 COY - Cub of the Year

Polar bear captures, North Baffin Island, 1980.

Bear Number	Reason	Sex	Age	Date	Location	Lat.	Long.
X5246	Capture	F	08	14 May 80	8 km E. Cape Liverpool	7342	07747
X5247	Capture	F	06	14 May 80	8 km N.W. Cape Fanshawe	7337	07727
X5248	Capture*	F	COY[1]	14 May 80	16 km N.W. C. Graham Moore	7258	07548
X5121	Recapture*	F	05	14 May 80	16 km N.W. C. Graham Moore	7258	07548
X5249	Capture	M	09	14 May 80	3 km N.W. Cape Weld	7237	07555
X5028	Recapture	F	04	14 May 80	3 km N. Cape Weld	7237	07540
X4999	Recapture	M	12	18 May 80	16 km E. C. MacCulloch	7230	07445
X5253	Capture	M	07	19 May 80	16 km N. Cape Burney	7313	07615
X5250	Capture	M	08	19 May 80	24 km N. Cape Burney	7315	07615
X5255	Capture*	F	U	19 May 80	Cape Byam Martin	7328	07709
X5256	Capture*	M	COY	19 May 80	Cape Byam Martin	7328	07709
X5251	Capture	M	04	19 May 80	8 km E. Bathurst Bay	7322	07649
X5257	Capture	M	11	25 May 80	24 km N. C. MacCulloch	7243	07511
X5258	Capture	F	04	25 May 80	Buchan Gulf	7355	07346
X5259	Capture	M	10	25 May 80	10 km E. of the Bastions	7150	07348
X5260	Capture	M	05	30 May 80	25 km N.N.E. C. MacCulloch	7243	07504
X5261	Capture	F	05	30 May 80	5 km E. Cape MacCulloch	7230	07500
X5262	Capture	F	03	30 May 80	16 km E. Cape Burney	7307	07554
X5263	Capture*	F	08	30 May 80	12 km E. Cape Burney	7305	07554
X5264	Capture*	F	02	30 May 80	12 km E. Cape Burney	7305	07554
X5265	Capture*	F	02	30 May 80	12 km E. Cape Burney	7305	07554
X5266	Capture	M	02	30 May 80	7 km S. Cape Walter Bathurst	7316	07640
X5267	Capture*	F	08	30 May 80	5 km S. Cape Byam Martin	7329	07700
X5268	Capture*	F	02	30 May 80	5 km S. Cape Byam Martin	7329	07700
X5269	Capture	F	02	31 May 80	3 km N. Cape Joy	7331	08312
X4439	Recapture	M	02	31 May 80	28 km W. Cape Joy	7339	08405
X5130	Recapture	M	07	4 June 80	8 km N. Cape MacCulloch	7233	07510
X5270	Capture	M	05	4 June 80	32 km E. Cape MacCulloch	7231	07411
X5271	Capture	M	04	4 June 80	28 km E. Cape MacCulloch	7237	07359
X5272	Capture	M	07	4 June 80	32 km E. C. Jameson	7204	07324
X5273	Capture	M	22	4 June 80	3 km E. Bathurst Bay	7321	07649

Polar bear captures, North Baffin Island, 1980. (continued)

Bear Number	Reason	Sex	Age	Date	Location	Lat.	Long.
X5040	Recapture	M	17	4 June 80	8 km N.E. C. Graham Moore	7250	07550
X5274	Capture	M	04	6 June 80	40 km E. C. Jameson	7205	07300
X5275	Capture	M	12	6 June 80	8 km N.E. C. Graham Moore	7256	07600
X5145	Recapture	M	22	7 June 80	7 km S. Walleston Island	7342	08056
X5276	Capture	F	05	7 June 80	Mouth Navy Board Inlet	7344	08108
X5277	Capture	M	04	7 June 80	12 km S.E. C. Crawford	7339	08448
X5278	Capture	F	18	7 June 80	5 km W. C. Hay	7343	08009
X5279	Capture	M	08	7 June 80	8 km N.E. Maud Bight	7340	07918

* Family Group

1 Cub of the Year

U Unknown

APPENDIX C. Results of mercury analysis of polar bear hair from bears captured in Lancaster Sound area during April, May and June, 1980.

Sample No.	No. of Estimations	Max. PPM	Min. PPM	Mean PPM	S.D.
5040	9	13.9	7.7	11.82	1.98
5130	13	12.2	6.8	9.43	1.61
5145	9	9.0	5.5	7.31	1.12
5260	5	7.5	5.6	6.50	0.78
5257	13	11.4	6.1	8.12	1.86
5258	13	6.4	5.2	5.91	0.37
5261	6	5.2	4.1	4.67	0.46
5265	4	7.1	5.0	6.16	0.96
5259	14	7.3	3.9	5.81	1.08
5262	6	8.5	5.0	7.05	1.29
5263	5	11.4	5.9	9.10	2.40
5264	4	5.3	4.1	4.75	0.55
5267	6	5.6	4.1	5.08	0.67
5266	8	8.6	5.2	6.58	1.12
5268	6	12.3	6.2	8.85	2.25
5269	7	8.1	5.8	6.93	0.80
5270 A	8	12.2	8.1	10.34	1.33
5270 B	11	6.8	4.2	5.60	0.86
5271	9	7.2	5.1	6.30	0.69
5272	11	8.7	2.8	7.02	1.72
5273	7	8.4	5.5	6.87	1.09
5274	11	5.4	3.9	4.51	0.54
5275	12	6.1	4.1	5.03	0.67
5276	10	7.2	6.4	6.68	0.33
5277	8	9.9	7.5	8.59	0.84
5278	11	6.9	4.8	6.37	0.61
5279	11	6.9	5.0	5.85	0.59

APPENDIX D. Resightings of marked polar bears in eastern Lancaster Sound, 1980.

Bear Number	Sex	Date	Location	Lat.	Long.
X4995	M	2 May 80	2 km E.N.E. C. Warrender	7428	08125
X5097	F	3 May 80	Croker Bay	7431	08257
X5105	F	4 May 80	Croker Bay	7431	08258
X5105	F	8 May 80	Dundas Harbour	7432	08222
X5108	M	2 May 80	Croker Bay	7434	08310
X5151	F	3 May 80	Cuming Inlet	7409	08502
X5151	F	6 May 80	Cuming Inlet	7428	08455
X5217	F	3 May 80	Maxwell Bay	7430	08835
X5050	M	3 May 80	5 km W. Powell Inlet	7428	08532
X4438	F	3 May 80	Croker Bay	7432	08306
X4438	F	4 May 80	Croker Bay	7433	08515
X5366	M	5 May 80	5 km S.E. C. Cockburn	7453	07918
X5238	F	5 May 80	Croker Bay	7436	08320
X5219	M	3 May 80	16 km E. Maxwell Bay	7427	08830
X5253	M	19 May 80	10 km E. C. Burney	7305	07550
X5121	F	19 May 80	8 km E. C. Graham Moore	7252	07548
X5028	F	25 May 80	8 km N.E. C. MacCulloch	7232	07455
X4999	M	25 May 80	8 km N.E. C. MacCulloch	7232	07455
X4999	M	30 May 80	5 km E. C. MacCulloch	7230	07500
X5262	F	30 May 80	32 km N.E. C. Burney	7307	07520
X5040	M	6 June 80	4 km S.E. C. Burney	7304	07615
X5270	M	6 June 80	16 km E. C. MacCulloch	7231	07438
X5265	M	4 June 80	3 km E. Bathurst Bay	7352	07657
X5273	M	7 June 80	32 km E. C. Walter Bathurst	7315	07615
Unknown	-	4 June 80	32 km E. C. Antrobus	7214	07355

APPENDIX E. Sightings of unmarked polar bears in eastern Lancaster Sound, Spring 1980.

Date	Location	Lat.	Long.	Sex
18 May 80	24 km S.E. C. MacCulloch	7222	07444	U*
7 May 80	Dundas Harbour Camp	7432	08222	F with COY
6 May 80	Hobhouse Inlet	7427	08703	U*
5 May 80	8 km S. Cape Parker	7508	07940	U*
4 May 80	24 km N.E. C. Sherrard		07950	M
3 May 80	8 km E. Maxwell Bay	7427	08835	U*
3 May 80	3 km S.W. Hobhouse Inlet	--	--	M
2 May 80	Cape Warrender	7427	08150	U*
30 Apr. 80	Powell Inlet	7410	08525	U*
29 Apr. 80	8 km E. Hodgson Head	7505	07950	U*

* U - Unknown

APPENDIX F. Pathology report on abandoned polar bear cub.

MENT OF VETERINARY PATHOLOGY
ERSITY OF SASKATCHEWAN
ONE 343-5671

FINAL REPORT

PATHOLOGY NO. M30 – 2749

DEAR DR. Haigh
ADDRESS L.A.C.

OWNER R.E. Schweinsburg, NWT Wildlife Service
ADDRESS Yellowknife, NWT. X1A 2L9

COPY TO DR
COPY TO
HISTORY

CLINIC NO.
DATE June 3, 1980
SPECIES Polar bear
BREED
AGE cub
SEX ♂
I.D.
NO. SUBMITTED one
PORTIONS OF

Cub seen alive at 2 mile from floe edge at 09.40 hrs on May 3/80 south of Devon Island NWT at a point 74° 30′ N 83° 50′ W. Backtracked dam and sibling seen at seal kde. Observed growling, twitching, even turned a somersault. Picked up, shipped to camp and obser Euthanasia with/ooomg at 2100 hours frozen and submitted. Please ensure complete disposa including hide.
Tentative Diagnosis: Rabies, starvation & hypoglycemia, encephalitis ??

PATHOLOGIC DIAGNOSIS
1. Starvation.
2.
3.
4.
5.
6.

ETIOLOGIC DIAGNOSIS
COMMENTS Absence of body fat and ingesta in GIT, and enlarged gall bladder all suggest starvation as the cause of death. Nervous signs may have been due to hypoglycemia. Rabies was ruled out by fluorescent antibody studies of brain. No other disease agents or lesions were detected in this bear.

F. A. Leighton, D.V.M. PATHOLOGIST

J. F. Orr, M.R.C.V.S. DIRECTOR

NECROPSY REPORT June 23, 1980
(SYSTEMS NOT MENTIONED HAD NO LESIONS)

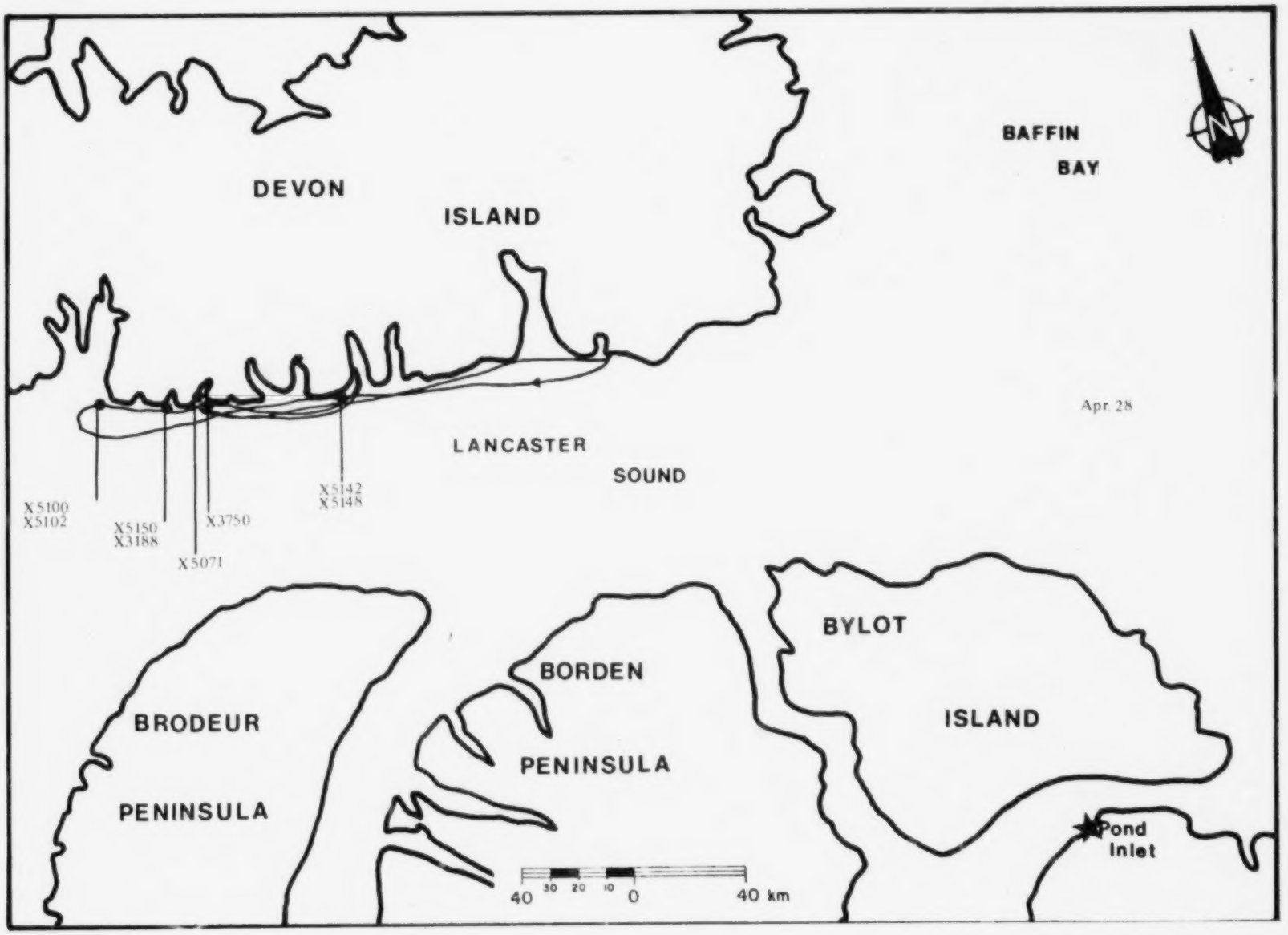
NECROPSY: 5/VI/80, 2:00 P.M.
GROSS NECROPSY FINDINGS: Hair coat good, no subcutaneous fat. No intraabdominal, perirenal or marrow fat (femur). GIT contained no ingesta. Ocular scleras were deep red – probable artefact of freezing. Stomach contained small amount of mucous. Small intestine contained blood tinged mucous. One section of the jejunum appeared hemorrhagic but this was hard to distinguish from effect of freezing. Rectum contained bile stained mucous and this was pasted on the perineum. Gall bladder was distended with bile. All internal organs were grossly normal. Femoral bone marrow was a translucent deep red and jelly-like in consistency. Tissues frozen for future reference. Brain vesse's were prominent but there were no other gross abnormalities.
HISTOLOGY: Thyroids were quite cellular. This suggested hyperplasia, but autolysis and freezing artefacts precluded precise assessment. A few foci of mineralization were present in the neurohypophysis. Bone marrow was somewhat hypocellular and devoid of fat. Large fat droplets were present in the cells of the adrenal cortex. The spleen was nearly devoid of lymphoid tissue. GIT was empty, but was otherwise unremarkable. There were no lesions evident in skeletal muscle (diaphragm, masseter), heart, kidneys, liver or lung.
MICROBIOLOGY: No bacteria were cultured from liver, spleen, kidney, or GIT. Brain was negative for Rabies virus antigen. PARASITOLOGY: No parasites were present in muscle of GIT.

lp

PHOTOS TAKEN

MEDICAL RECORDS

APPENDIX G. Daily flight maps; Polar Bear Tagging April, May and June, 1980 in Lancaster Sound.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BAY
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LANCASTER
SOUND
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X5102
X5150
X3188
X3750
X5071
X5142
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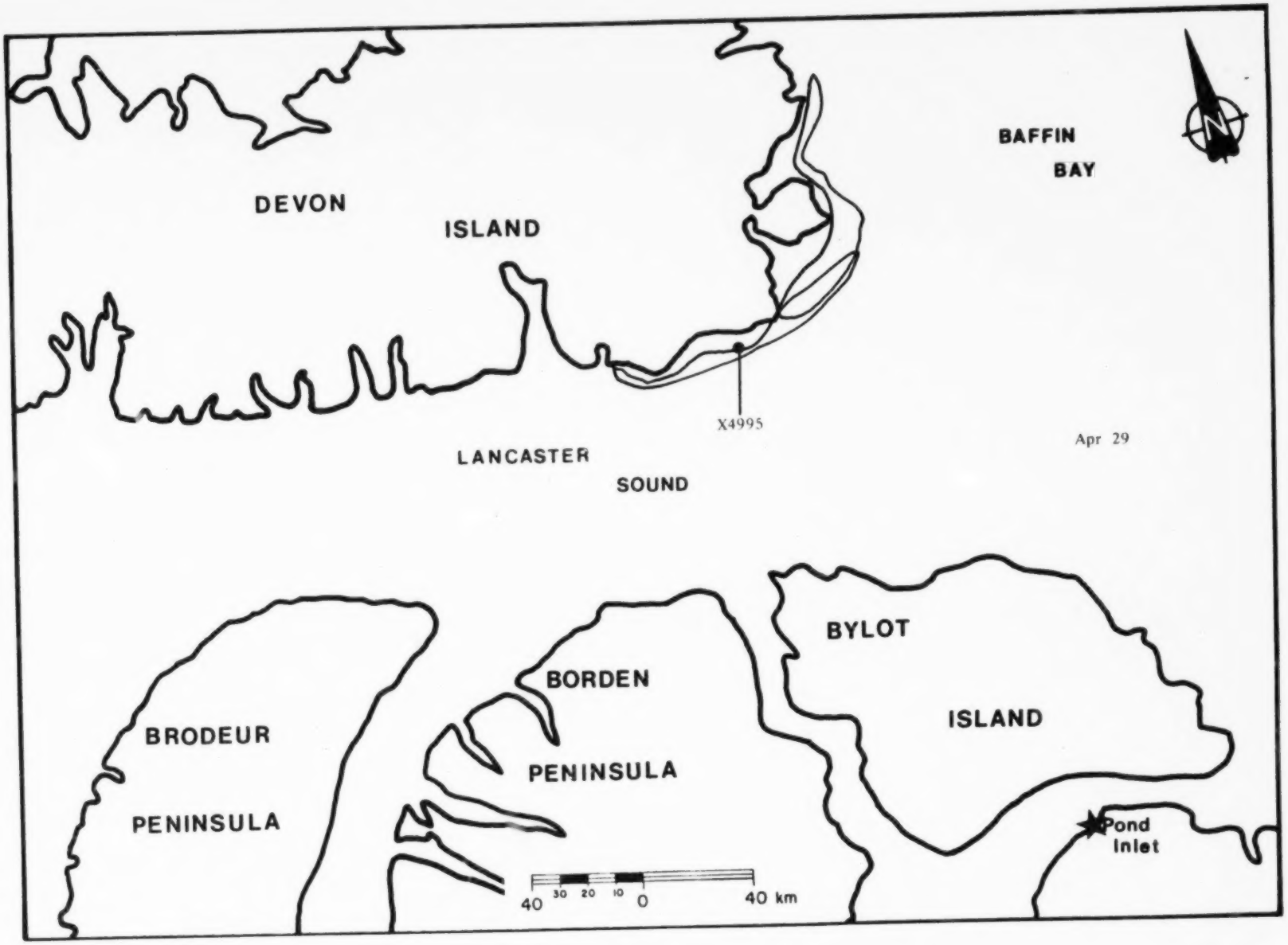
BYLOT
ISLAND
BORDEN
PENINSULA
BRODEUR
PENINSULA
Pond
Inlet
40 30 20 10 0 40 km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BAY
DEVON
ISLAND
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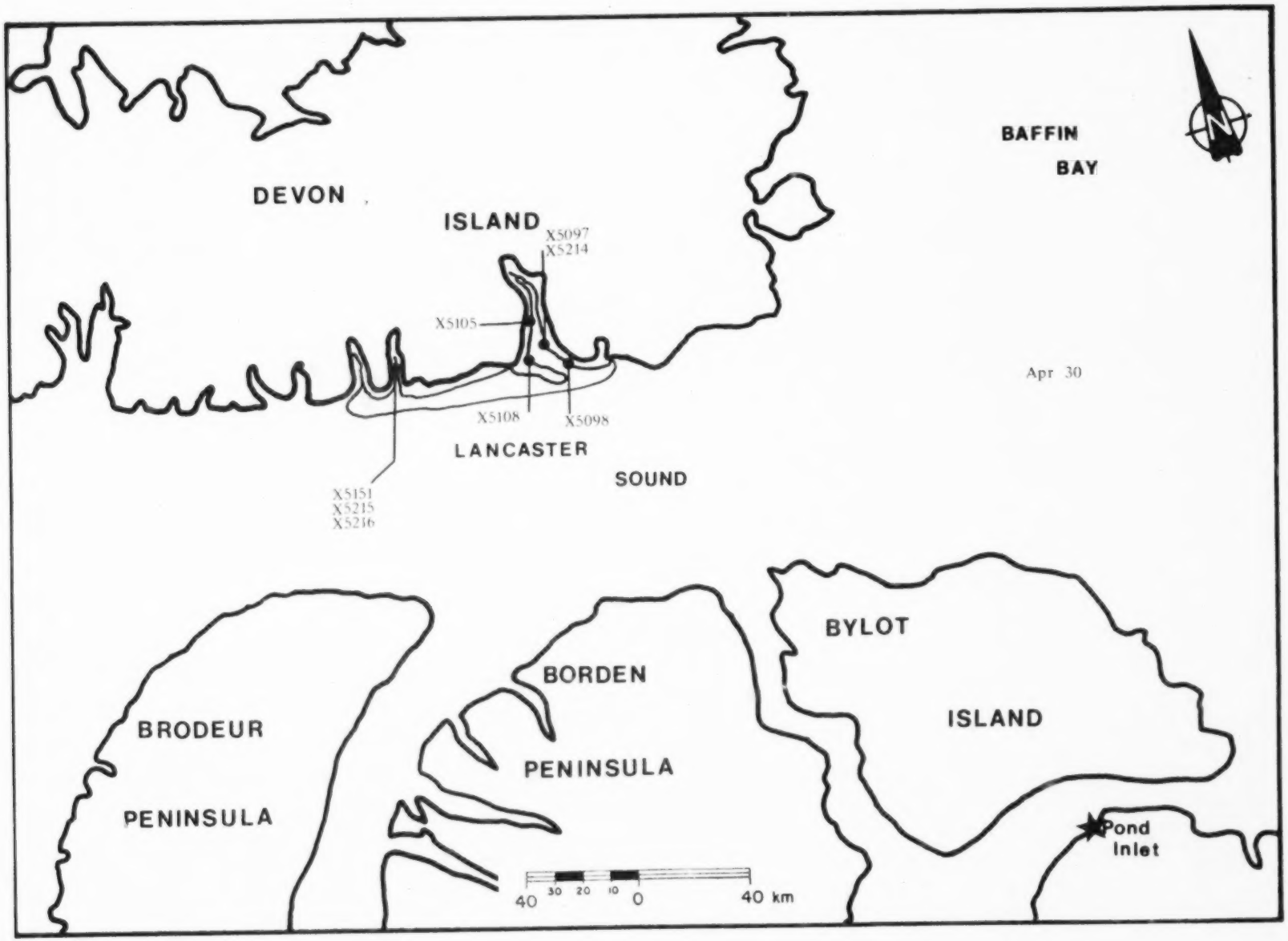
Apr 29
LANCASTER
SOUND
BYLOT
ISLAND
BORDEN
PENINSULA
BRODEUR
PENINSULA
Pond
Inlet
40 30 20 10 0 40 km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BAY
DEVON
ISLAND
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X5214
X5105
Apr 30
X5108
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LANCASTER
SOUND
X5151
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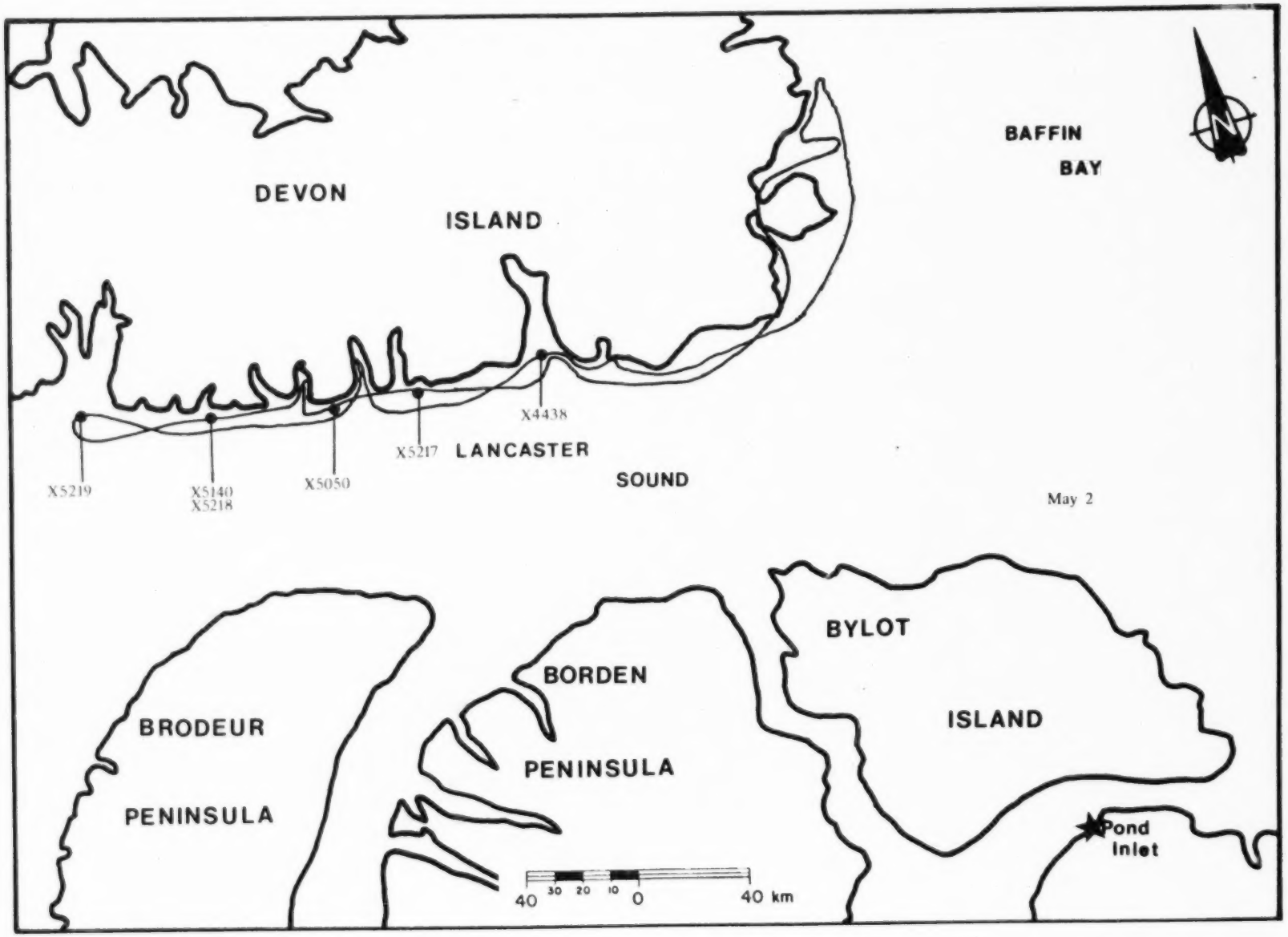
BYLOT
ISLAND
BORDEN
PENINSULA
BRODEUR
PENINSULA
Pond
Inlet
40 30 20 10 0 40 km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SOUND
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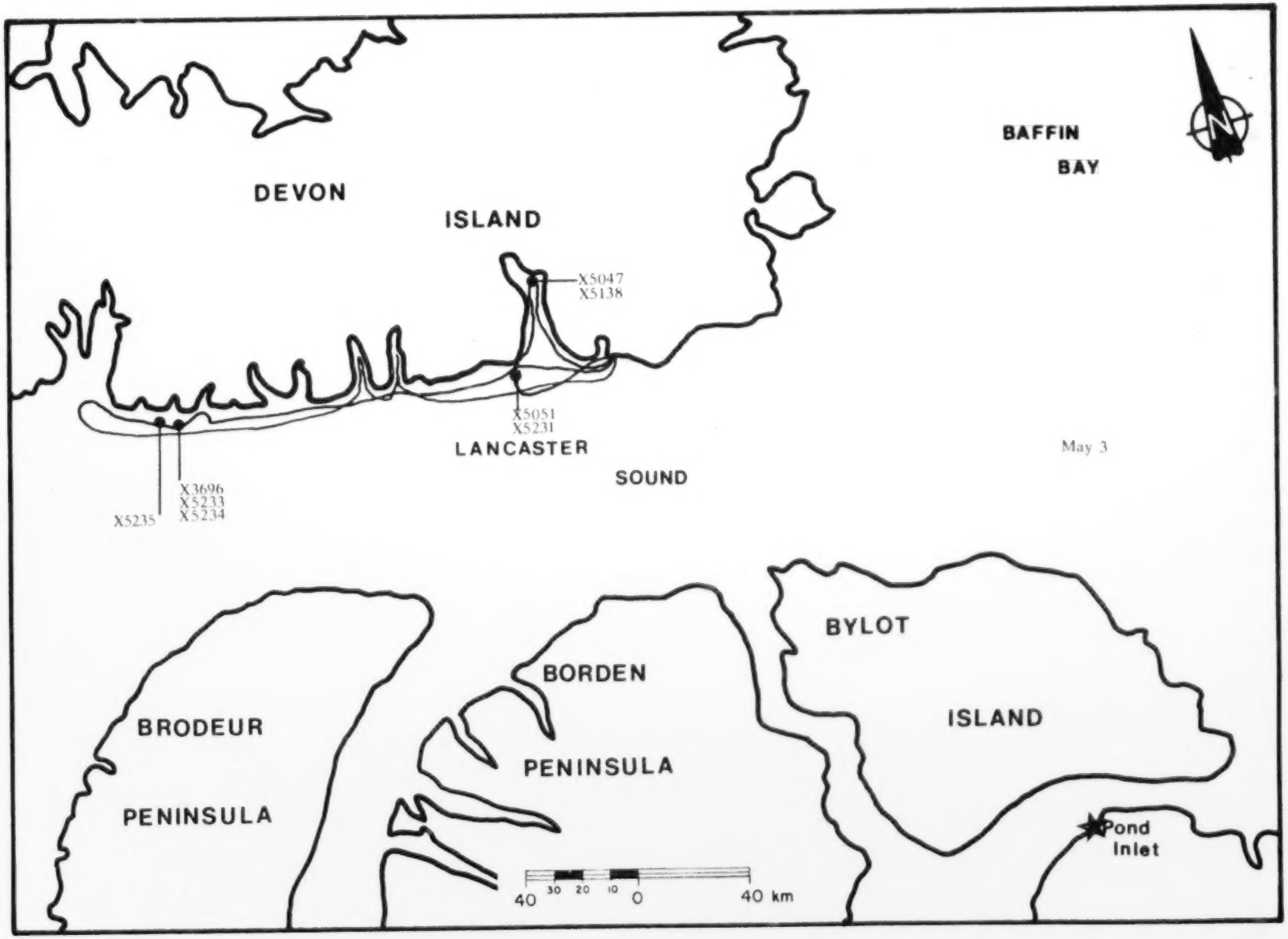
BRODEUR
PENINSULA
Pond
Inlet
40 30 20 10 0 40 km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BORDEN
PENINSULA
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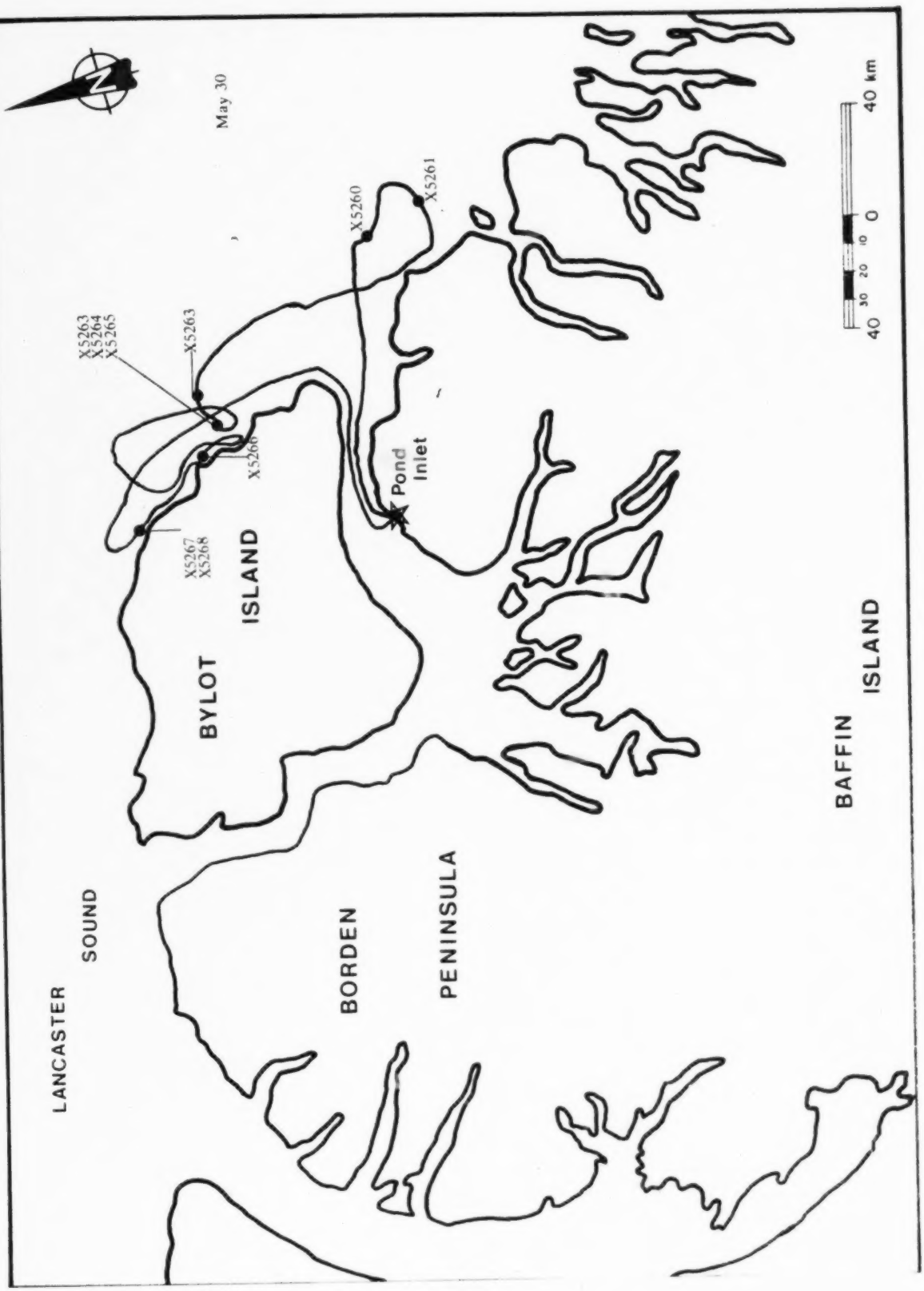
ISLAND
Pond
Inlet
40 30 20 10 0 40 km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Inlet
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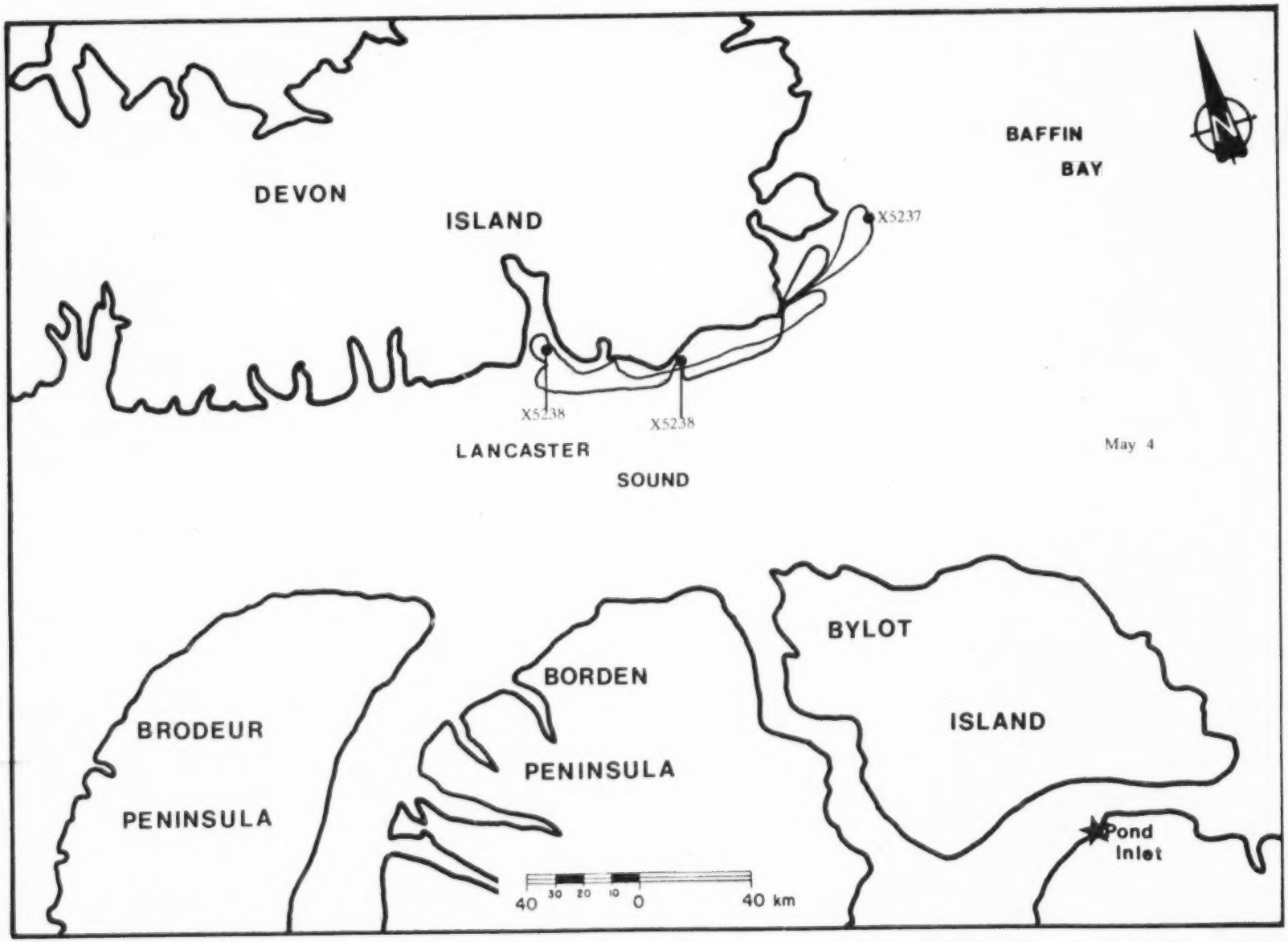
BORDEN
PENINSULA
BAFFIN
ISLAND
40 km
40 30 20 10 0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BAY
DEVON
ISLAND
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LANCASTER
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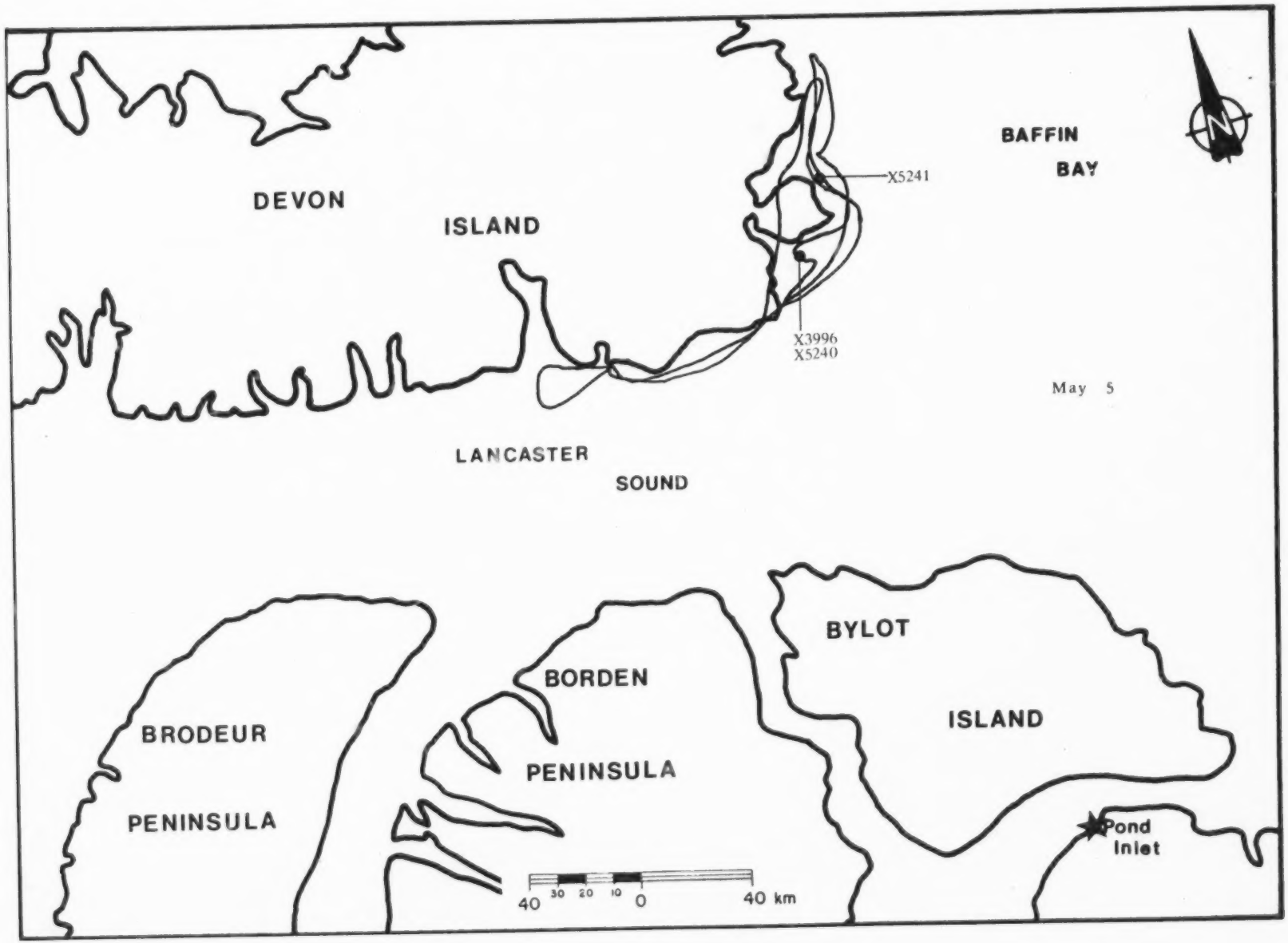
BYLOT
ISLAND
BORDEN
PENINSULA
BRODEUR
PENINSULA
Pond
Inlet
40 30 20 10 0 40 km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BAY
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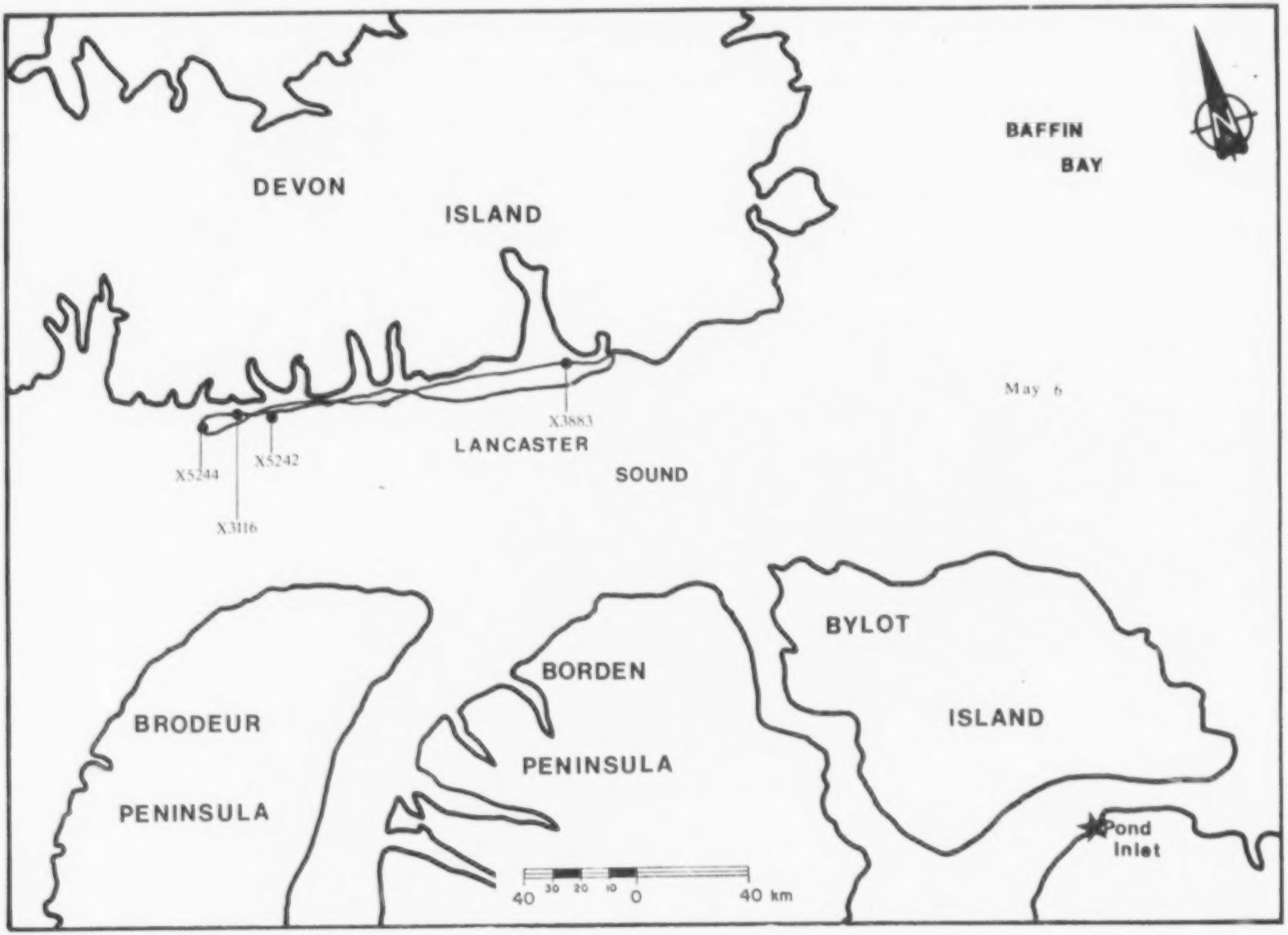
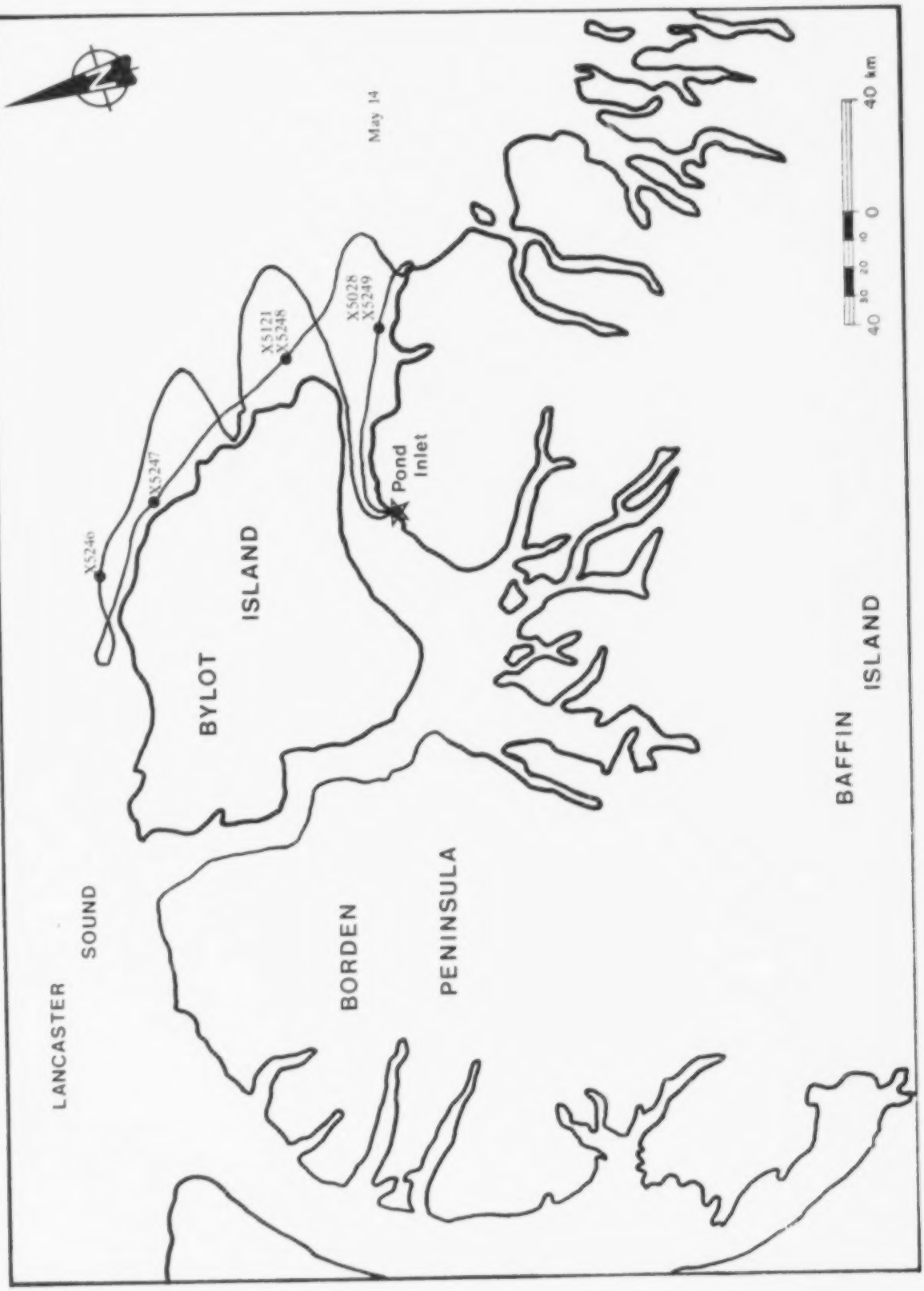
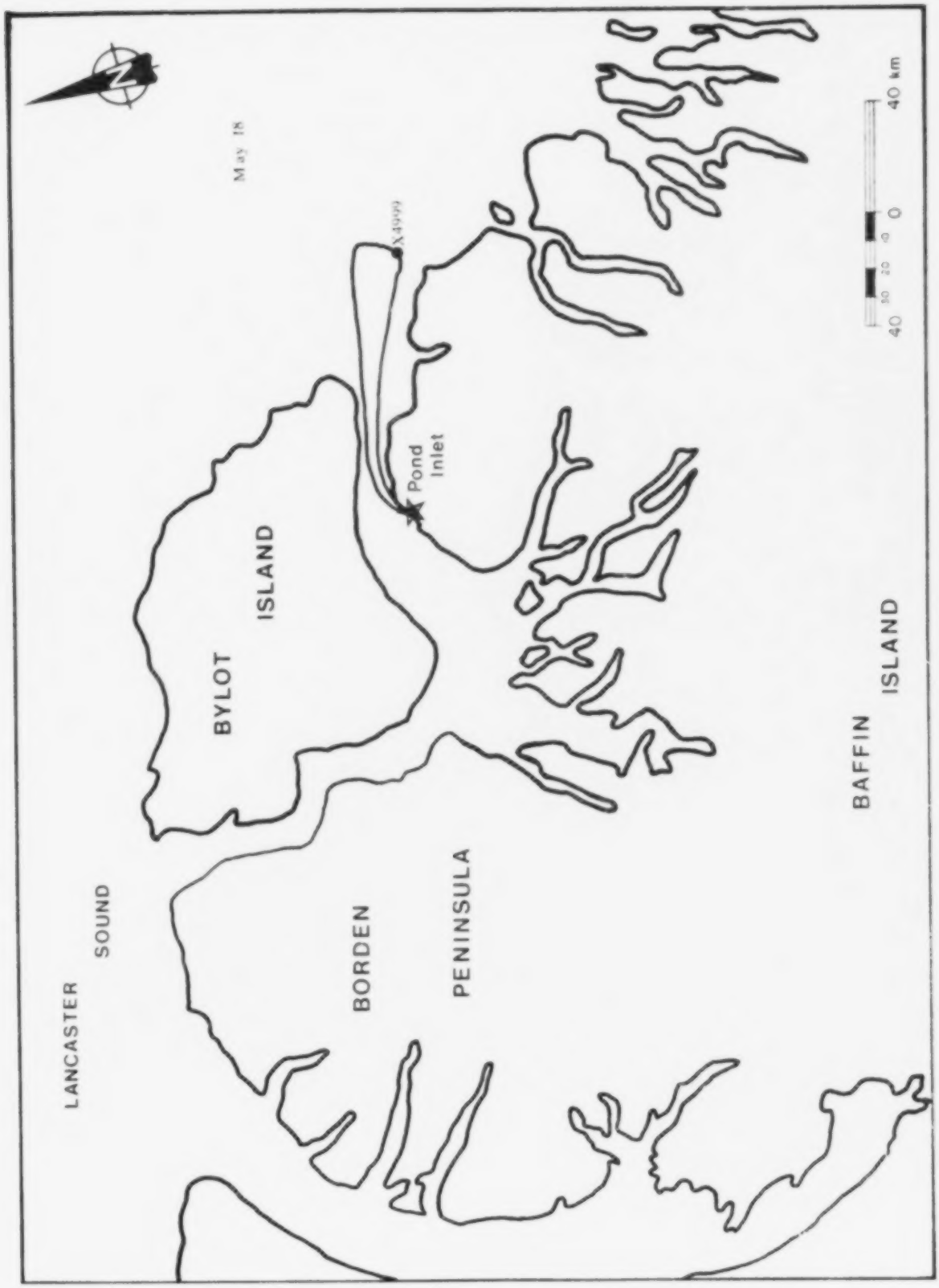
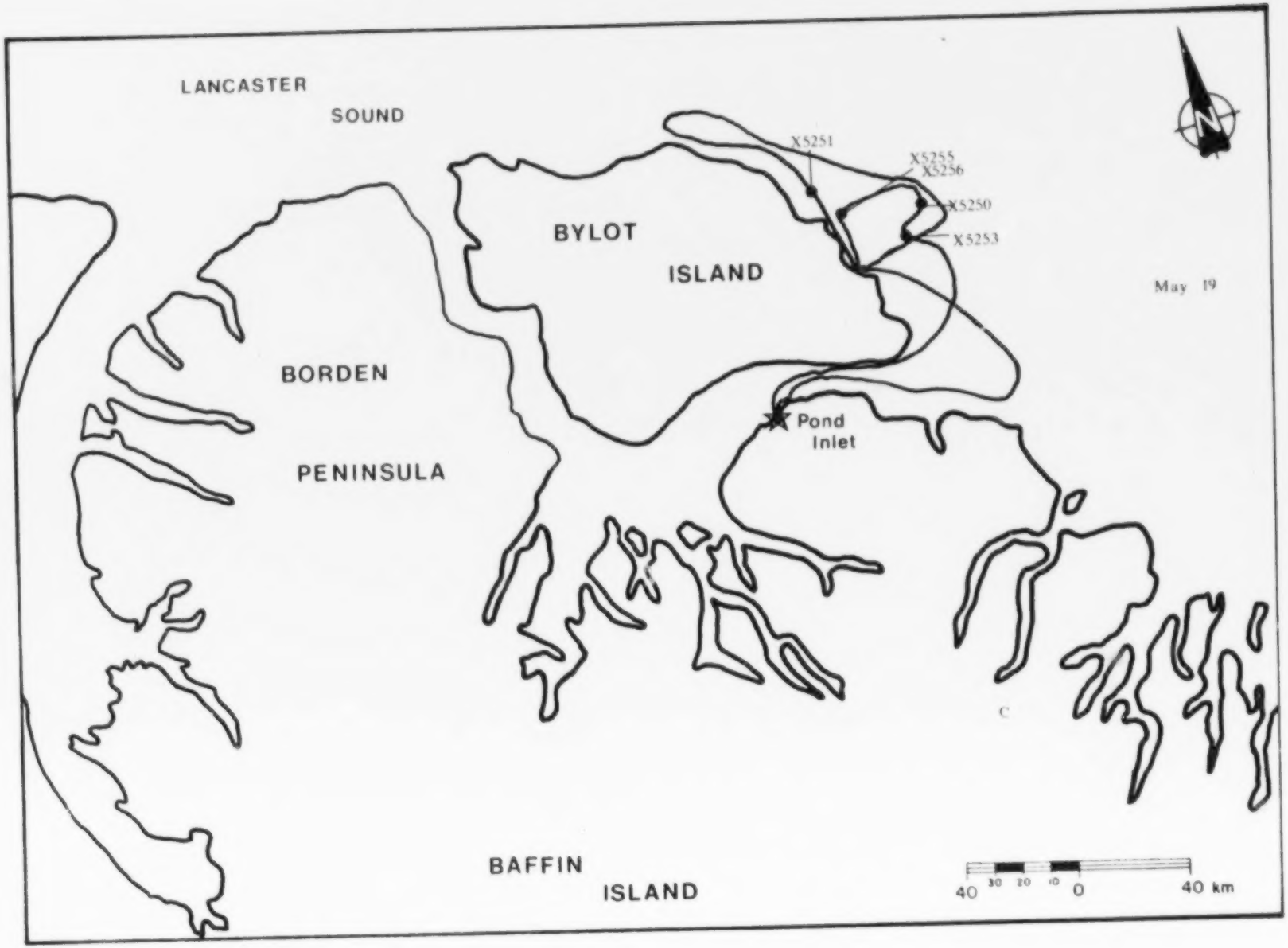
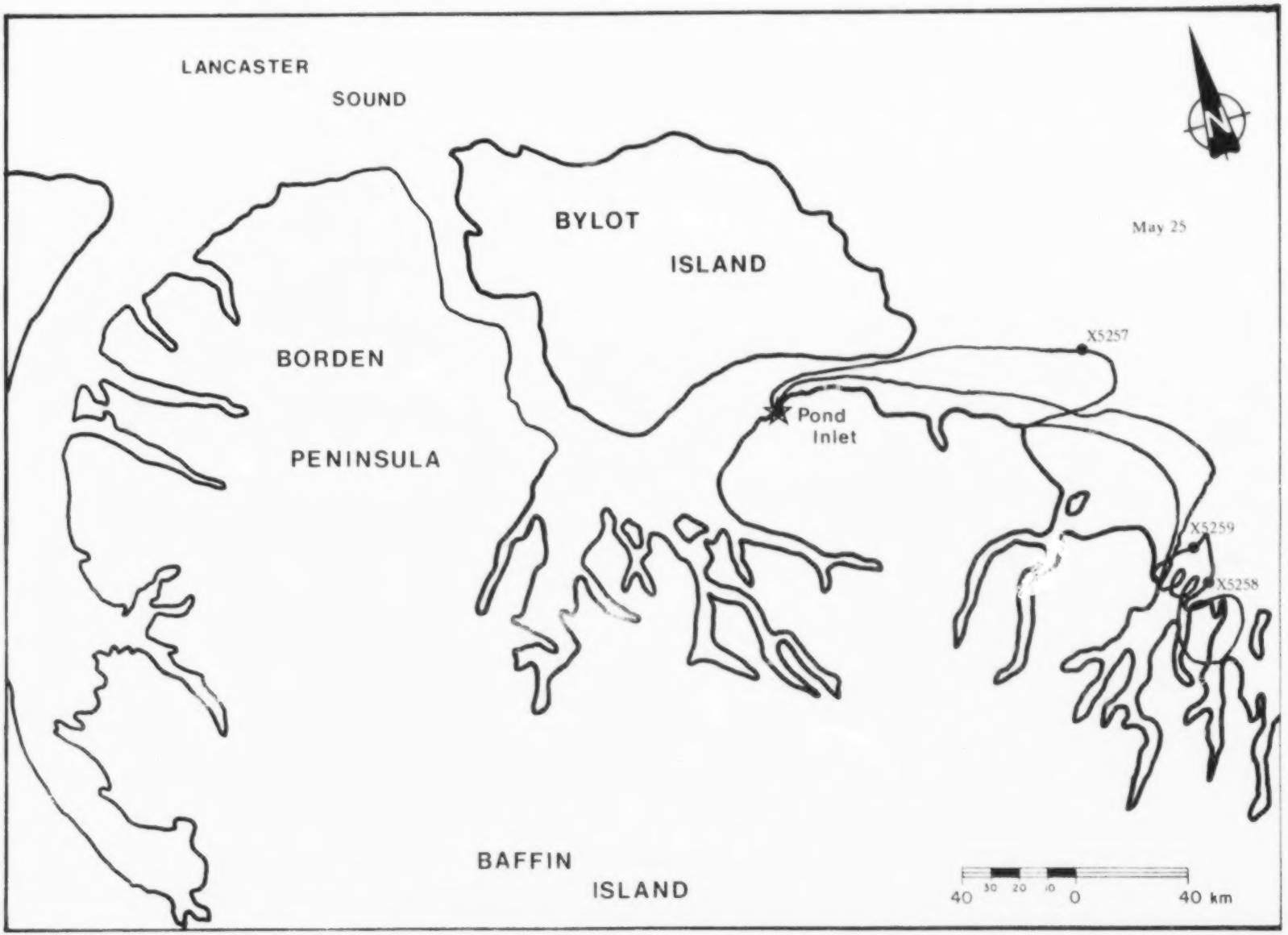
X5240
May 5
LANCASTER
SOUND
BYLOT
ISLAND
BORDEN
PENINSULA
BRODEUR
PENINSULA
Pond
Inlet
40 30 20 10 0 40 km

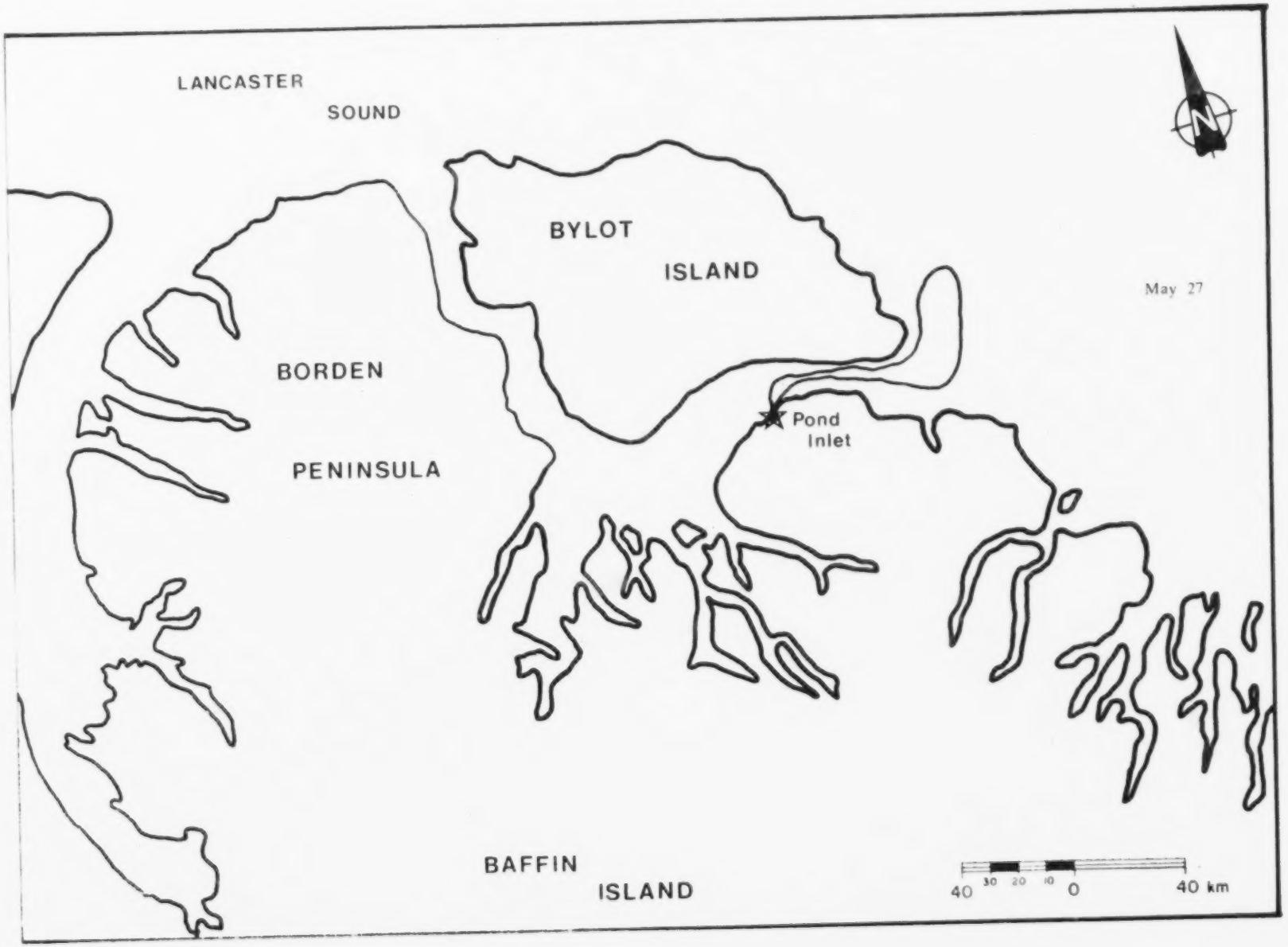

DEVON
ISLAND
BAFFIN
BAY
N
May 6
X3883
LANCASTER
SOUND
X5244
X5242
X3116
BYLOT
ISLAND
BORDEN
PENINSULA
BRODEUR
PENINSULA
Pond
Inlet
40 30 20 10 0 40 km

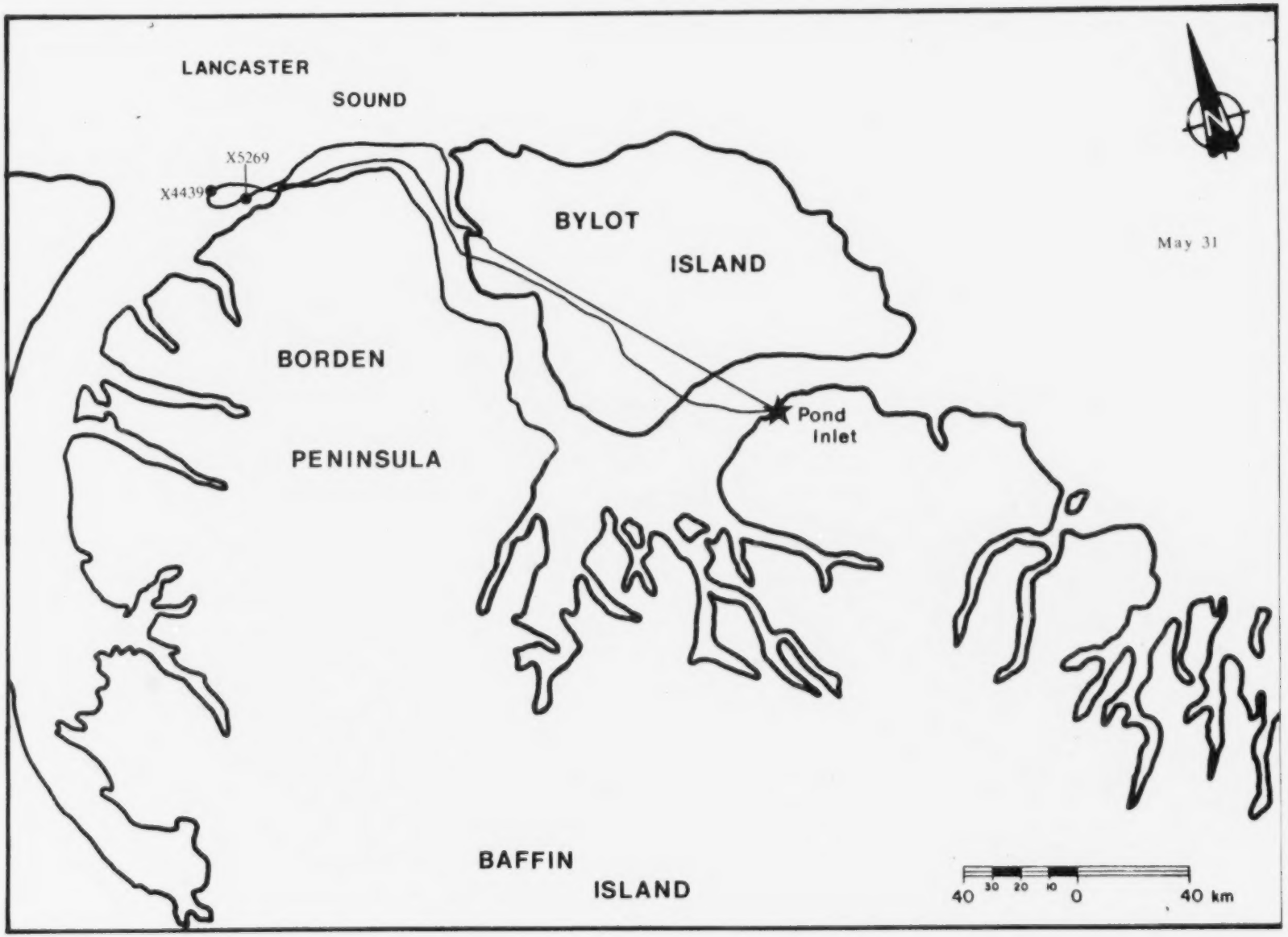

LANCASTER
SOUND
BYLOT
ISLAND
BORDEN
PENINSULA
BAFFIN
ISLAND
Pond
Inlet
X5246
X5247
X5121
X5248
X5028
X5249
May 14
40 km
40
30
20
10
0

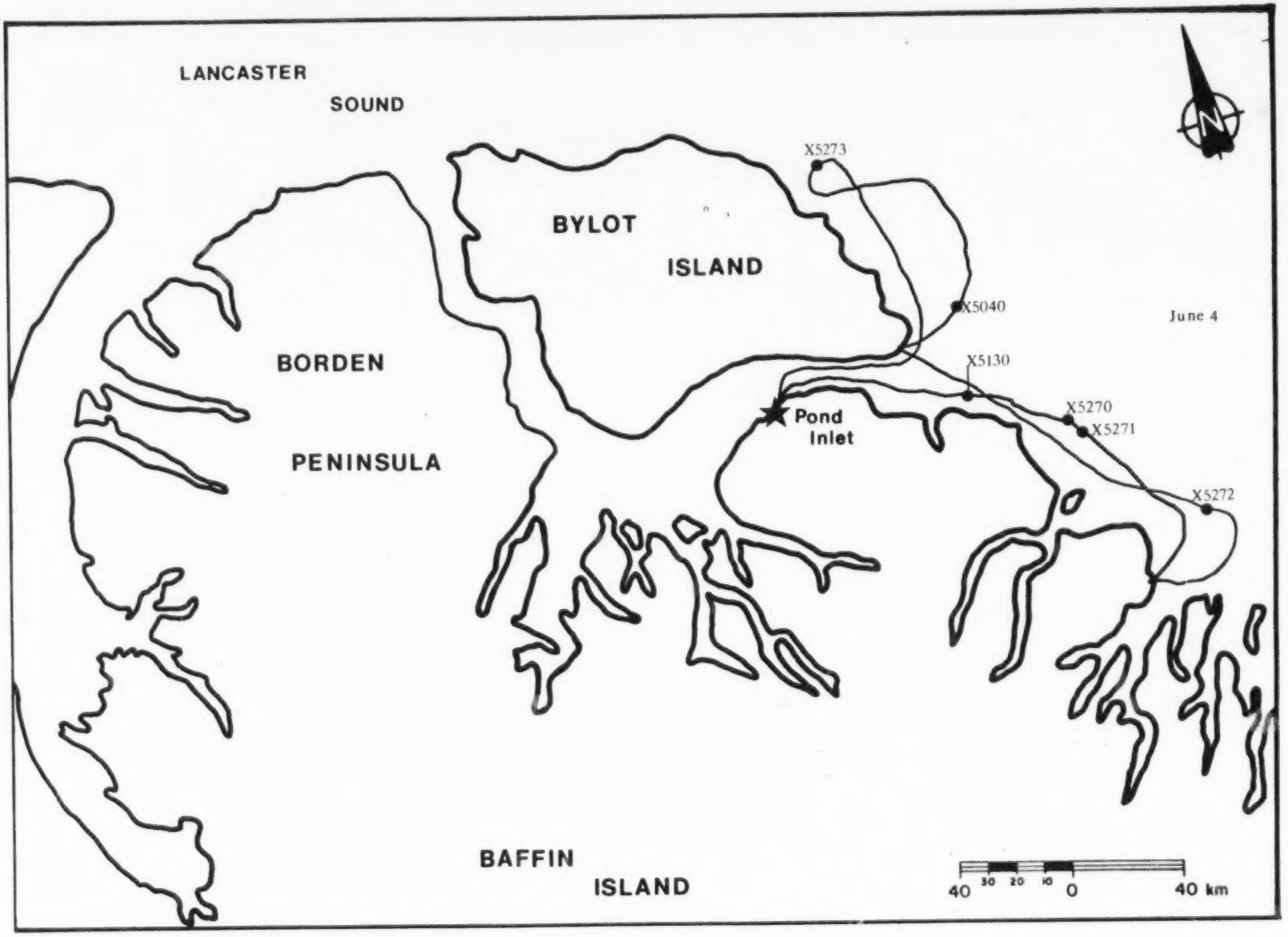

LANCASTER
SOUND
BYLOT
ISLAND
BORDEN
PENINSULA
BAFFIN
ISLAND
Pond
Inlet
May 18
40 km
0
40

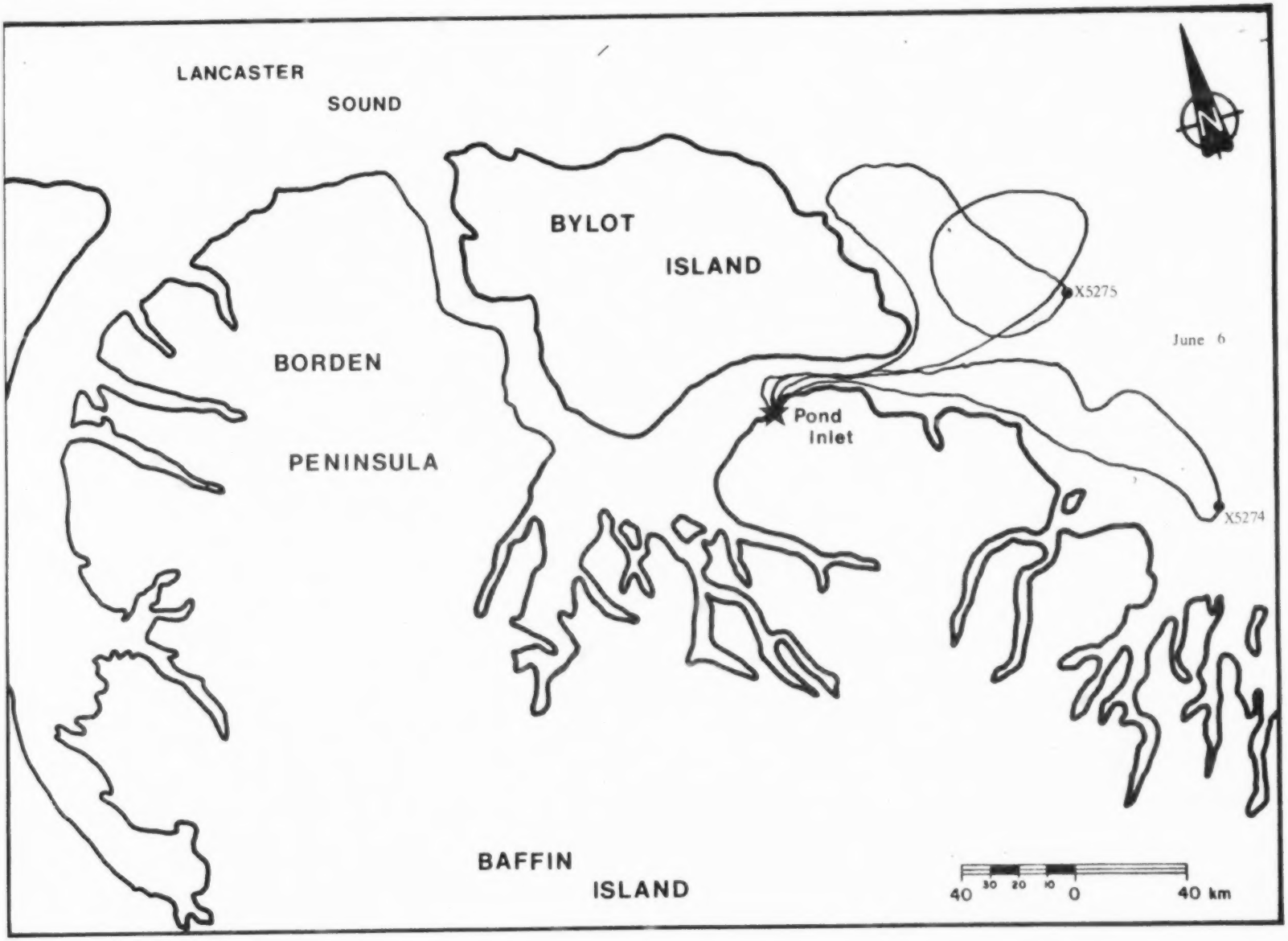

LANCASTER
SOUND
X5251
X5255
X5256
X5250
X5253
BYLOT
ISLAND
May 19
BORDEN
PENINSULA
Pond
Inlet
BAFFIN
ISLAND
40 30 20 10 0 40 km

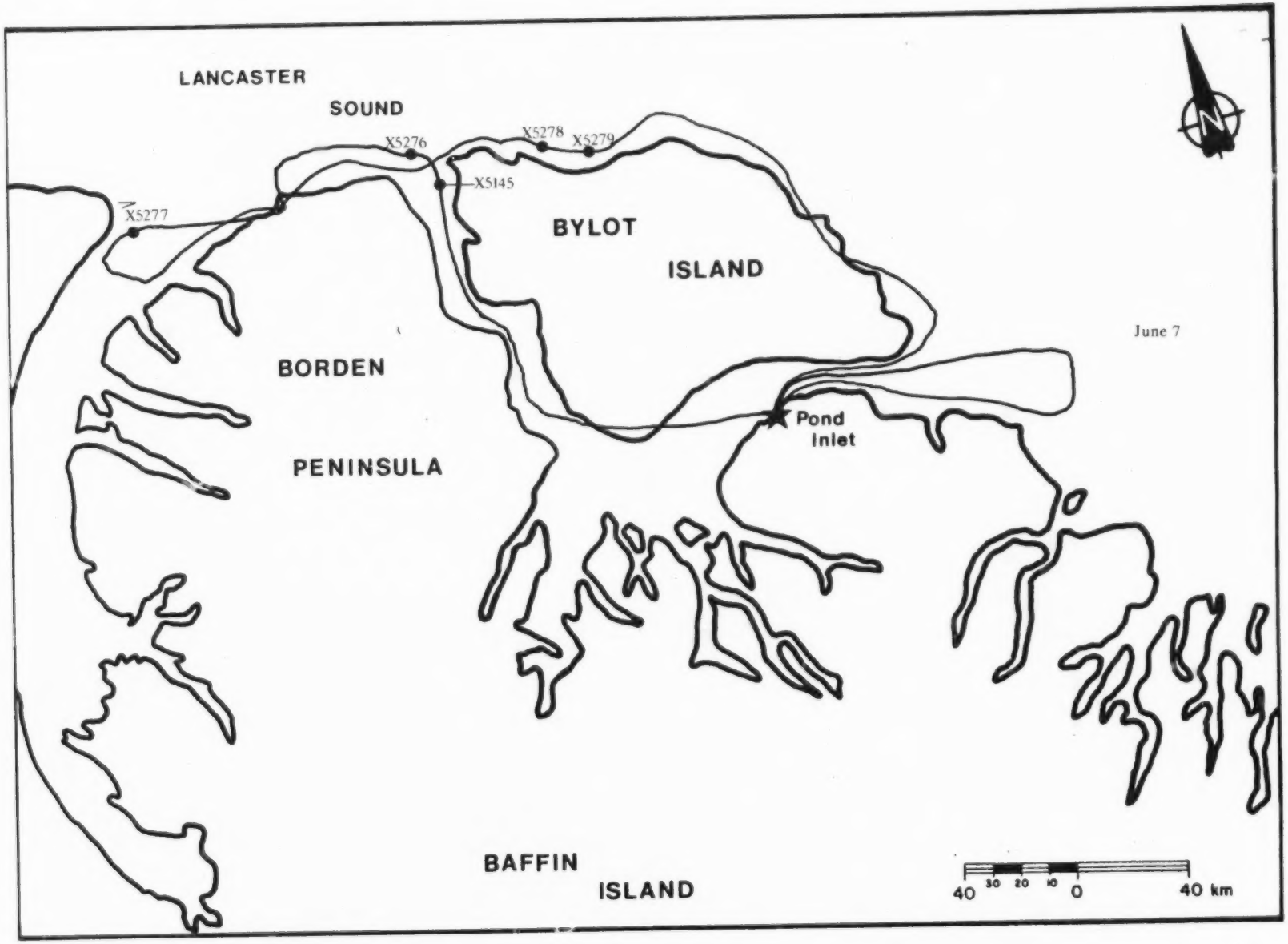

LANCASTER
SOUND
BYLOT
ISLAND
May 25
BORDEN
PENINSULA
X5257
Pond
Inlet
X5259
X5258
BAFFIN
ISLAND
40 30 20 10 0 40 km


LANCASTER
SOUND
BYLOT
ISLAND
May 27
BORDEN
PENINSULA
Pond
Inlet
BAFFIN
ISLAND
40
30
20
10
0
40 km


LANCASTER
SOUND
X5269
X4439
BYLOT
ISLAND
May 31
BORDEN
PENINSULA
Pond
Inlet
BAFFIN
ISLAND
40 30 20 10 0 40 km


LANCASTER
SOUND
BYLOT
ISLAND
BORDEN
PENINSULA
BAFFIN
ISLAND
Pond
Inlet
X5273
X5040
X5130
X5270
X5271
X5272
June 4
N
40
30
20
10
0
40 km


LANCASTER
SOUND
BYLOT
ISLAND
BORDEN
PENINSULA
Pond
Inlet
X5275
June 6
X5274
BAFFIN
ISLAND
40 30 20 10 0 40 km


LANCASTER
SOUND
X5276
X5278
X5279
X5145
X5277
BYLOT
ISLAND
June 7
BORDEN
PENINSULA
Pond
Inlet
BAFFIN
ISLAND
40
30
20
10
0
40 km